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JONATHAN TO JOHNNY BULL.

With my mortal coil a-quaking and with curious inward shaking,
Like a fellow in whose vitals skips about some reptile vile,
I began the poem cheerful in THE OPERATOR, fearful
Of a scolding; but my terror soon was smothered in a smile.

I attacked ye like a foeman; but with friends I fought; and, oh man,
By Saint Patrick, in the city of New York I'll meet ye yet;
Then will Jonathan and merry Johnny Bull and *Tom and Jerry*,
Who are flippant, being egg-flip, have a funny day, you bet!

Fredrick Thomas is my darling. Sure I never saw him snarling,
Tho' we toiled two years together in the Dublin G. P. O.
So you say he feels in clover! Faith I'm glad, and so is Glover—
Friend of Freddy—dont you know him? Fared ye well in Buffalo?

Now because that I am havin' such a heap to say, to Flavin;
To the hero from Havana hot; to Holland from Tralee;
And to Johnny Bull and all, sir; say on them my blessings fall, sir;
Even Morse is now a friend, sir, and a worthy friend is he.

And his voice is never mute. He just as well can do his duty
As the Wheatstone who with broken letters, good enough for Morse,
Oft reminds of that quadruped which to trust were sometimes stupid,
And whose pranks are past our "*guessing*"—a poor broken-winded horse!

Asking what has broke the breath of Wheatstone soon will be the death of
Me. I wonder was it from his rapid race across the sea?
He is now a sort of sea-horse. He is evidently THE horse.
Foremost in the file of all four-legged animals is he.

Broken letters breed displeasure—blunders, too. A perfect treasure
Would be Wheatstone if his lungs were settled; he's a splendid horse;
HUM would be like pegtop flying; STONE nor stick would send him shying
If he found the fodder Fairness, ever fed upon by Morse.

Strange that I, at first full merry, dwelling on dear Tom and Jerry,
Now should talk like priest or prophet preaching to an erring age;
But the fact is I am human, and, like any man or woman,
Use in sore and solemn seasons voice and visage of a sage.

Both these lightning-legged racers are the best of steeds, I say, sirs.
Let them run, but not as rivals, and shake hoofs, if not shake hands.
Give them lusty cheers, my Sonnies, for, by gorra, they are honeys,
And, with backs unbending, bravely bear the business of all lands!

Farewell, lads, and if forever, still forever—no—no—never
Will I plagiarize; I nearly stole from Byron. Fred avick—
Flavin—all—farewell! This closes rhyming. Tell me where was Moses
When the light was quenched—What! So ye give it up? I do. I'm sick.

CHICAGO. L. BAKER.

Machine for Covering Wire.

The two most common kinds of covered copper wire in the trade are magnet wire and office wire. Both kinds are covered with cotton thread, spun around in two layers wound in opposite directions.

Magnet wire is so called because it is usually employed for electro-magnets, and possesses no other covering. Indeed, it does not need it, because if once wound around the iron core there is no danger that the cottons will shift and destroy the insulation. In winding it, however, care should be taken to separate the successive layers by a sheet of thin strong paper, so as to prevent leakage by the pressure. The successive windings do not need such a precaution in the way of separating them, one from the other, as there is no such pressure and not as much tension of the current as there is between successive layers. When extraordinary precaution is required to protect the insulation of currents of high intensity against sideward leakage, as is the case in the construction of dynamo-electric machines, every layer is painted with a varnish made of shellac or rosin diluted in alcohol. This is much better than a paraffine solution, which insulates well but is too soft to be secure against crushing pressure, which is sometimes considerable in those machines.

Office wire is so called because the cotton covering is secured against the shifting of its windings by being passed through melted paraffine or wax, which penetrates and saturates the cotton, forming a protecting covering and making the wire better able to stand the wear and tear to which it may be subjected while putting it up in offices, and also in some cases after it has been put up. Magnet wire is unfit for this purpose, as the covering of cotton thread, being loose, is always in great danger of being destroyed, thus allowing the wire to become exposed.

These are, as stated, the most common wires. Office wires are often combined to form small cables of 2, 3, 6 or any number of wires, which are then again covered with cotton and passed through the melted paraffin. Fine copper wire for relays and telephones is usually covered with silk, for the purpose of making the insulating covering as thin as possible. This brings the coils as close together as possible, and, consequently, close to the iron cores of the magnet—its power depending largely upon the short distance of the wire from it. The close windings also reduce the length and consequently the resistance of the coils, which is a most important element in the question of obtaining the maximum amount of attractive power.

In regard to the latter consideration, it is also important to use the purest possible copper wire, as the least intermixture of alloy reduces the conducting power most surprisingly. Thanks to the ease with which pure copper can be obtained from the waste of electrotypes, and from the Daniel and gravity batteries of telegraph offices, it is much more easy nowadays to obtain pure, good-conducting copper wire than it was some years ago.

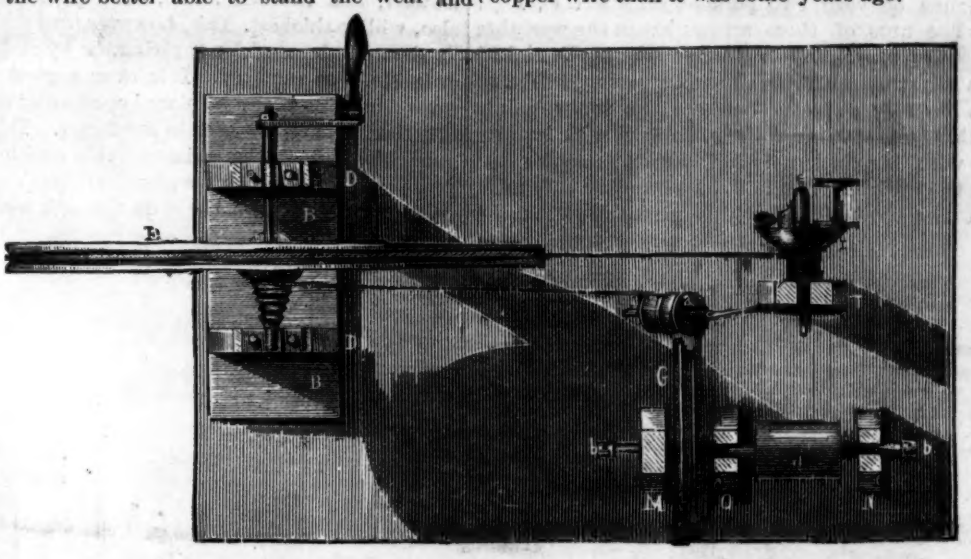

FIG. 1.

We will give here a description of a simple apparatus of such a character as can be made everywhere, and which is intended for the covering of wire with cotton or any other thread. We do this for the reason that we know that there are many of our readers who do not live near large cities where a supply of such things as an electrician or experimenting student of electricity may need can be obtained. Copper wire and cotton or silk thread of any thickness can be had almost anywhere, which is not the case with wound wire.

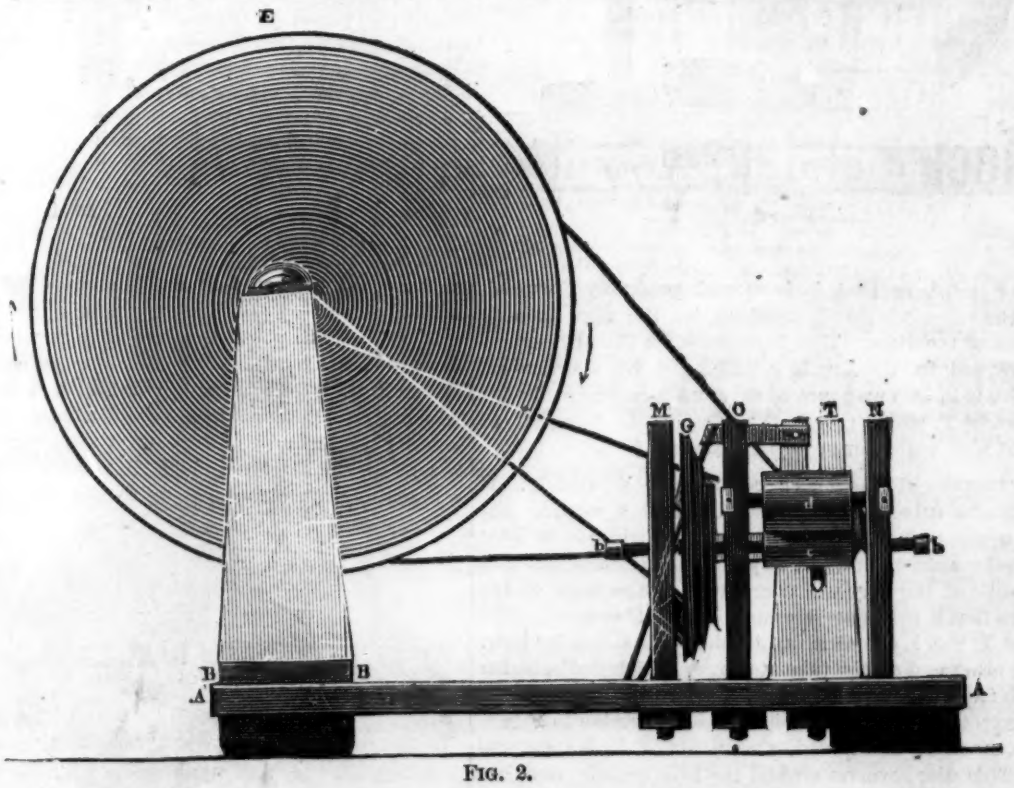

FIG. 2.

As the machine here described is almost entirely made of wood, and very simple, any competent carpenter or cabinet-maker, aided by a plain turner, can make it. He must, however, use well-seasoned wood. Our first figure represents the machine as seen from above; Fig. 2 gives a front view; Fig. 3 an end view, reduced to one-quarter of the natural size, and Fig. 4 a section of the winding spindle, while Fig. 5 gives the face of the winding pulley represented in its actual size. In all the figures the cor-

responding parts are marked with the same letters.

The solid base *A* is seen in the first three figures. Under this base are four supports, one at each corner, seen in Figs. 2 and 3, to leave room below for screws and nuts. *B* is a piece of board, carrying two uprights *d d*, and it is screwed on one end of the base by a wood-screw *c*, Fig. 3, and nut below the board base *a*. This screw passes through a slit in the base, so as to make it possible to move the piece *b d d*, Figs. 1 and 3, forward or backward, so as to stretch the cord which passes over the large disc *e* and the small pulley on the spindle, Fig. 4. The axis of the disc *e* rests upon the top of the vertical supports *d d*, and is kept in place by wooden blocks, or better still, a pair of brass straps screwed down—see Fig. 1. On this axis is a handle to turn it, seen in Figs. 1 and 3. On this same axis, at the other side, is a very small pulley of conical shape, having four grooves, and seen in Figs. 1, 2 and 3. The conical shape is intended to shift the cord so as to obtain different velocities of the cord running over it, which cord is intended to turn the pulley which moves the wire to be covered slowly forward. This cord runs over two pulleys, *a a*, Figs. 1 and 2, each of which runs loosely over an iron axis placed obliquely on the base *A*, and kept in place by strong strips of brass attached below to the base *A*, and above to a support *T*. These strips of brass can be removed, and have slits at their ends on which a screw fits to keep them in place when screwed tight. The pulleys *a a* serve to change the direction of the cord to an angle of 90 degrees, and to bring it over the disc *G*, Figs. 1, 2 and 3, which has three groves, and the iron axis of which runs between two pointed screws *C C*, Figs. 1 and 2. The nuts of these screws are in the uprights *M N*. A third upright *O* is situated between *M* and *N*, and has a slit through which the axis passes loosely, so that it can be easily adjusted between the screw points *C C*. On this same axis is a roller *o*, covered with leather, which lies with its axis loosely in two slits, made for that purpose in the uprights *N* and *O*. Its function is to press the wire to be covered and which passes between the rollers *o* and *d*, so that it is moved gradually forward, when the roller *o* is slowly revolved by the cord passing over one of the discs. This happens when the large wheel *E* is turned in the direction indicated by the arrows. The wire is in this way moved at a uniform rate toward the upright *T*, which carries the contrivance intended to cover it with cotton or any other thread.

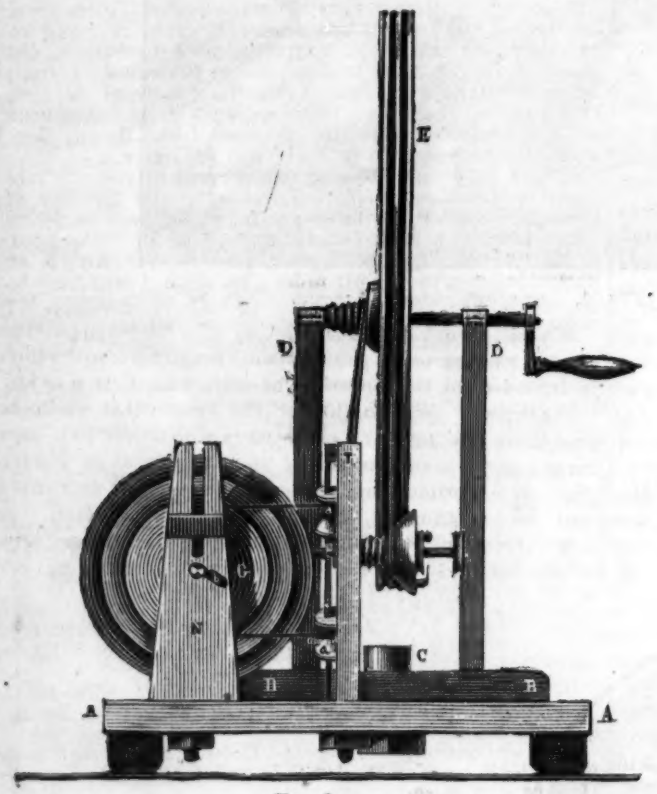

FIG. 3.

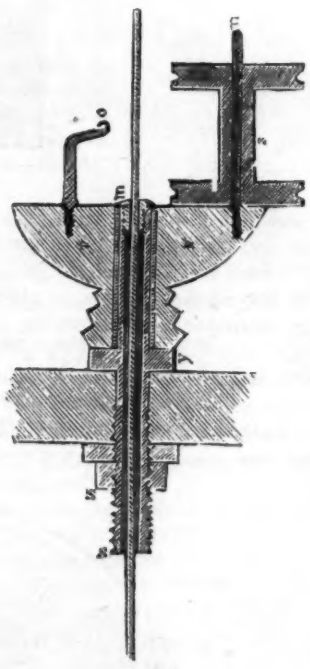

FIG. 4.

Fig. 4 represents the latter contrivance separately. It consists of a tube *n*, which passes through a vertical slit in the upright piece supporting the same, while it is kept in place by a shoulder and nut placed at such a height that the middle of the wire will correspond to the axis of the tube, so that it may pass through without contact. The upright *T*, Fig. 1, can also be shifted along a slit in the base. At the other end of the tube *x*, Fig. 4, which projects far enough from the upright *T*, Fig. 1, is a revolving disc, seen in perspective in Figs. 1 and 3 and in section in Fig. 4, which, as above mentioned, represents it in its natural site. This disc revolves around the tube or axis, and has several grooves of various diameters, so as to give it greater or lesser velocity, by shifting the cord running over the large disc from a smaller groove to one of larger diameter. The axial hole in the disc is fitted with a piece of brass tubing very little wider than the tubular stationary axis, so as to allow it to turn quite easily around it, but it is kept in place by a perforated screw *m* (Figs, 4 and 5), of which several are required, as the central perforation in the same must be almost exactly equal to the wire to be covered, allowing only room enough to slide easily through. On the disc is a smooth wire *n* which carries a spool *S*, on which is wound the cotton or other thread with which the wire is to be covered. The thread, while unwinding from this spool, is first passed through from one hook *o* before it reaches the wire to be covered. As this spool may revolve too fast and so prevent the thread from remaining stretched while being wound around the wire, a brake is attached in the form of a thin brass wire *g g*, as shown in Fig. 3, the front view of this disc *I*, Fig. 4 and Fig. 1. This piece of brass wire *g g* is attached with one end to a hook *k*, Fig. 5, and passes over a groove in the rim of the spool, while it is stretched at its other end by the thumbscrew *i*, around which it is wound. In this way the resistance against the revolution of the spool may be increased according to necessity, to wind the thread more or less around the wire. It is evident that, with this arrangement, the relation between the forward motion of the wire and the velocity of revolution of the covering thread can be regulated at will, and the covering may be laid on with more or less thickening. When the cord is placed on the groove next to the large disc *E*, Figs. 1 and 3, where the diameter of the conical pulley is largest, and on the smallest disc of the wheel *G*, as represented in Fig. 3, the roller *d*, Figs. 1 and 2, moves fastest, and the wire is therefore moved forward in the fastest manner which the machine can accomplish. The covering will then be the thinnest. If, however, we place the cord in the groove furthest from the large disc *E*, where the diameter of the conical pulley is smallest, and on the largest disc of the wheel *G*, Figs. 1 and 3, the roller *d* will move slowest, and the wire, and, consequently, the covering also, will be thickest. This, however, can also be regulated by the material used for covering, or by making it double or treble, if so required. It is even a good plan to have several bobbins of thread placed upon a disc of larger diameter than that represented in the figure. This was done in a machine which the writer of this article made many years ago, and which gave great satisfaction. It allowed an opportunity to run the wire through with much more rapidity, the wire of four spools shortening the time four times.

It is best to place the wire to be covered on an easy movable roller in front of the machine, so that it may be drawn in with the minimum resistance. The covered wire which accumulates at the other side must be received by another person and coiled up on a ring or moved on a spool. In the machine which the writer made this spool was revolved automatically by means of an axis receiving

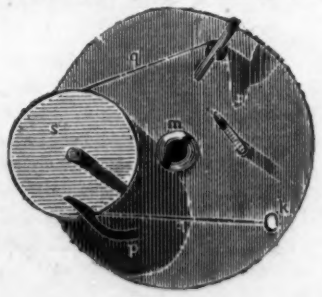

FIG. 5.

its motion from a third cord passing over an additional pulley between the disc *G* and the roller *d*, Figs. 1 and 3—not shown in these figures, but easily attached thereto.

The construction of such a machine, or something similar, can scarcely be too highly recommended to all who wish to experiment economically. It will be found to work much better than would be expected from an even somewhat defective combination. Without such a contrivance much valuable time may be lost in attempts to insulate without it.

Such machines can be and are used for other purposes. Braid and cord makers, and others who make ornamental or useful objects where one thread is wound around another, use similar but very costly and complicated machines.

There is an inverse method—that is, to let the wire to be covered turn around its own axis by stretching it between two hooks revolving with the same velocity. Thus revolving the wire will wind around itself any covering thread which may be presented to it. This method is not, however, so well adapted to the covering of long wires. For this reason it is used almost exclusively by those who manufacture bass strings for musical instruments, in which case only short ends of wire have to be covered with other wire.

Electric Lighting—XIX.

RESISTANCE OF THE ARC (CONTINUED).

It has been found that the observations of M. Edlund on the variations of the resistance of the arc are only true up to a certain limit; that is to say, the resistance of the arc is inversely proportioned to the volume of current used, and increases at a small but regular rate as the length of the arc increases, as shown by M. Edlund, but only while the arc retains its normal character. As we lengthen the arc, a certain point is reached where the arc begins to "flare," as electricians say, and then the resistance appears to be modified by additional causes. While the arc flares, its flame is increased in volume, and forms a mass of fire that plays around the upper carbon in wavy tongues; in short, it gives the observer the impression that the positive carbon is ablaze, the appearance being somewhat comparable to that of a lighted match held flame downward as it begins to burn at the tip. The length of the arc is what sets up the flare in it, as just stated, but the arc does not always begin to flare at the same length. Thus some arcs can be lengthened to more than twice their normal lengths without flaring, while other arcs begin to flare with the slightest increase in length. Satisfactory evidence is lacking to establish the causes of these peculiarities, but it is quite probable that the character of current used has some influence upon them. The writer inclines to the opinion that of two currents the more continuous will be less subject to cause a flaring arc, and the more wavy will have the greater tendency to make the arc flare with a small increase in length. Again, in this case the electromotive force of the current, its volume and the size of carbons used doubtless exercise some influence on the distance at which the flare begins. The distance to which the carbons may be separated after the flare is set up in the arc, depends on the electromctive force of the current almost entirely. Thus, with dynamos of low electromotive force a separation of a fraction of an inch beyond the distance where the flare begins will cause the arc to break, while with dynamos of high electromotive force the arc may be separated to a distance of many inches. Now, the resistance of a flaring arc does not seem to follow M. Edlund's rule very precisely. The moment the arc begins to flare, its resistance appears to lessen slightly, and, what is still more strange, it does not increase after that with the length of the arc at the same rate as before. The ratio of increase becomes diminished in a marked manner, and the arc will increase in resistance only slowly with each increase in length. It is presumable that this rate of increase remains so small only for the first periods of the lengthening of a flaring arc, however, for when it has become lengthened so much that it is about to break, its resistance must be increasing at a rate that rises in very rapid progression toward infinity. One thing is certain, that when the arc begins to flare, its heat is greater and the carbons are consumed more rapidly. We might infer from this that the incandescent vapors in the flaring arc are more conducting than in the normal arc, and that we may thus explain its comparatively low resistance. Now, as the length of a flaring arc increases the crater gradually flattens and disappears. We have already noted the fact that as the normal arc increases in length the positive crater becomes broader and shallower. In the flaring arc it becomes much shallower still, and as the arc lengthens further it disappears entirely, the end of the positive carbon becoming rounded off. In this condition we might say that the crater has become inverted, for the action now proceeds from the whole tip of the positive carbon. Perhaps the greater number of carbon particles thrown into the arc from the carbons to increase the volume of the vapors under these circumstances serves to explain why the resistance does not increase as rapidly as before the flare was set up. The amount of light produced in the arc is greater after it begins to flare. Indeed, if the flaring arc is lengthened sufficiently the light given off may be doubled. The arc itself is not so intense, however. It is only because the luminous mass is greater that the light is increased. The density of the light is much less. Frequently one can penetrate it with the naked eye and discern clearly the tips of the carbons, which cannot be done in the case of the normal arc. The light is also apt to give a play of blue and violet colors when it flares. The energy consumed in the arc is of course directly proportional to its resistance, as in the case of any other conductor, as was explained when treating of

resistance. Now, if the flaring arc has a lower resistance and gives more light, then it is manifestly economy to let the arcs flare in the lamps. But the light is too unsteady to render this feasible. The heated air currents cause the arc to sway from side to side and the outside part of the flame or halo to flit about so restively that the light is very unsteady and also variable in color. Besides this there is the difficulty of regulating the length of such an arc and of maintaining several of that kind in one circuit.

In order to regulate the length of the arc we depend on the increase of resistance as shown in the last article, and as the resistance of a flaring arc increases only slowly for the first periods, the regulation could not be accomplished readily. Generally in a circuit of several arc lights the flaring of one gives rise to the "robbing" of the rest. The circumstances are usually that the feeding mechanism of one lamp fails to operate with sufficient rapidity or else it becomes stopped entirely. Thus the consumption of the carbons makes this arc increase gradually in length until it begins to flare, while at the same time the arcs of the other lamps gradually weaken and grow shorter until the carbons collapse altogether, leaving only this one burning, with a gradually increasing arc that may reach a length of several inches. In order to prevent this undesirable result whereby one bad lamp may put out all the others,a contrivance called a "cut-out" is used that automatically short-circuits such a lamp after the arc has increased to a certain length by failure of the feeding mechanism to act properly. In practice the inconvenience of a flaring arc is always avoided as much as possible by adjusting the regulators so as to maintain the arc at a short length, considerably below the flaring point. However, the nearer we can approach the flaring point the better, for the amount of light given out by the arc per horse-power—and consequently its economical value—increases with its length.

COUNTER ELECTROMOTIVE FORCE.

We have had occasion to observe several times in reference to the phenomena of induction in dynamo-electric machines that electrical currents always produce a reaction in magnetic systems that tends to oppose them. These were called "Lenz effects." A Lenz effect is a reaction against the current; it may take the form of magnetic attraction, or repulsion, but it may also take the form of a counter electromotive force, as we found when studying the oscillations of the lines of force in the magnetic fields of dynamo electric machines. Now, in the voltaic arc we have a precisely analogous "effect" in the form of a counter electromotive force; in other words, there is a tendency in the arc to transfer current in the opposite direction to the current producing the arc. It was M. Edlund who discovered this fact also, in 1868. He found that the arc itself would give a current through a branch circuit between the two carbons after the main circuit had been interrupted. Of course the time that this current lasted was extremely brief; his observations were made as soon as one eightieth of a second after interrupting the main current. He even measured the difference of potential representing the value of this electromotive force, with a short arc produced with 26 Bunsen cells, and found it to be 16.8 volts. In another case with a stronger current it was found equal to 26 volts. M. Leroux has shown latterly that the arc can be interrupted for one twentieth of a second and relighted again without requiring to bring the carbons together, because the heated vapors retain their conductivity for that length of time. He finds also that this counter electromotive force subsists until the end of that period, though, of course, it diminishes with greatly increasing ratio. The figures given by M. Edlund therefore depend on the time and the current, and possess only abstract value. Sir Wm. Thomson has measured the difference of potential and the arc produced with 79 Daniell's cells and finds it to be 27.3 volts. But it is plain from the source of current used that the arc could not have been large. The counter electromotive force of the ordinary circuit arc is probably very much higher. M. Alfred Niaudet has obtained a counter electromotive force as high as 55 volts; but his results were obtained with stronger currents, and with an arc much longer than is ordinarily the case. The average arc would probably vary between 30 and 40 volts of counter electromotive force.

The nature of this counter-electromotive force has been closely studied by many able scientists, but thus far with very little benefit. Thus M. Joubert has emitted the opinion that the electromotive force is a phenomenon of polarization in the vapors between the carbon points. On the other hand, M. Leroux thinks the phenomenon is purely therm o-electric, or resulting from the diffrence of temperature between the two carbons. M. A. Niaudet thinks that the mechanical action which causes the abrasion of the particles of carbon and impels them across the arc should be considered an additional cause of the counter electromotive force. It may be that all of these theories are true to a certain extent, but it seems more probable that the theory of M. Leroux is the correct one. In my opinion the difficulties which have been experienced in elaborating this theory are caused only by a failure to take into account a most important fact—the reversibility of thermo-electric phenomena. We seemed to have forgotten that all actions involving the operation of force are reversible: electricity can produce magnetism and heat, etc., and these in turn can produce electricity. Now, if we proceed to nalyze the counter electromotive force of the arc from this form of view, we encounter no serious difficulty in explaining the facts. A brief review of thermo-electric actions may be of resistance.

When two pieces of different metals are soldered together so as to form a closed circuit, and one of the junctions is heated more than the other an electric current arises in the circuit, whose direction will depend on the nature of the two metals. Thus with bismuth and antimony the current would move from the bismuth to the antimony at the heated junction. This phenomenon may be displayed by means of any two metals, though not in an equal degree. Thus in voltaic batteries we find that zinc and platinum, or carbon give a higher electromotive force than zinc and tin or lead. So in this case the two metals just mentioned give a higher electromotive force than any other combination, such as bismuth and copper or zinc, for instance. Not only metals alone, but other dissimilar conductors will likewise produce the phenomenon. In the voltaic arc we have carbon for one, and the flame of incandescent matter for the other, both conductors of electricity, though not necessarily metallic. It may be said here, moreover, that the counter electromotive force in the arc occurs with metallic points instead of carbon, which supports the inference that the gaseous vapor is one of the thermo-electric elements of the arc. Now, to make things plainer, we will suppose a very long arc between two antimony points. The arc, we suppose, replaces the bismuth. Now, if we heat *the arc* at one end more than the other, and also the antimony at that end, in other words, we will heat one junction of the arc and the points; then we cause a difference of potential between the two elements of the couple that will tend to set up a current through the arc, supposing that none was passing. We are well satisfied, from the remarks of M. Rosetti's, previously alluded to, that such a difference of temperature between the ends of the arc does exist in the normal arc produced from continuous currents. But how does it arise? That is what we propose to explain now, by the aid of the so-called "Peltier effect." This constitutes a most important discovery, for it leads to the "Lenz law of thermo-electricity." As we shall show, M. Peltier's discovery was that if a current of electricity were sent through a junction of two dissimilar metals or conductors, that is to say, a thermo-electric couple, this junction would become heated when the current passed in one direction, and would, on the contrary, become cooled when the current passed in the other direction. For instance, in our bismuth-antimony couple above, if we passed a current from any external source in the *same* direction as that which was produced by heating one junction, this heated junction would now begin to *cool*, while the others would begin to *warm up*, and if the current were maintained long enough, the heated one would become as cool as the other was, and vice versa, so that on discontinuing the external current the thermo-electric couple would now return a current *in the opposite direction*. In a word "*the distribution of heat by the current in a thermo-electric couple is always such as to give rise to an electro-motive force that opposes the current.*" In this way we see that the Peltier effect is an exact analogue of the "Lenz effects," for like the latter it always tends to oppose the motion (current) producing it. The above statement is in reality Lenz's law itself stated in slightly different words to apply to this case. This shows clearly that the scope of this all-important law is greater than one would think. Now we can see from these details that the counter electromotive force of the arc is a natural enough consequence of the conditions present. While the current from the generator is passing it is continually displacing the heat, so to speak; it produces the Peltier effect of making one part warmer and the other cooler, and thus it is causing a difference of potential that means an opposing electro-motive force, just exactly as the current can transfer the oxygen to one pole in a secondary battery and bring about in that battery the rise of an electromotive force that opposes the main current.

C. O. M.

The Ocean Cables of the World.

The amount of capital at present invested in submarine cables is very large, and it is a gratifying fact that, considering the risks of the enterprises, capital could be so easily secured to weave under a large portion of the various seas a net of telegraph cables.

The total length of the cables of the world is 60,000 miles—more than twice the circumference of the earth. Basing the estimate on the supposition that on an average forty wires are used for each cable, including the wires in the covering, the amount of iron and copper wire employed in the construction of these cables is about two and a half million miles—or ten times the distance of the moon.

As far as reports have reached us, there are at the present moment seventeen companies in operation, while four governments have their own private cables. Of these governments, the English stands greatly in need of cables for the security of its trans-oceanic possessions, as without them its extensive domain would surely fall to pieces. This is a very different condition of affairs from that imagined by the prime minister of Great Britain sixty years ago. When, in 1823, Ronalds patriotically offered the invention of his electric telegraph to the government, the minister ordered one of the clerks to inform the applicant that in time of peace such telegraph would be of no use whatsoever, and that in case of war the existing telegraphs with visible signs were quite sufficient.

At present the English government has, besides all its extensive net-work of land lines, of which it has reserved for itself the monopoly, submarine cables from Fao to Bushire, Persia, Gwader and Kurachee, amounting to 1,218 miles, while more are being laid.

The French government has a cable from Leghorn to Bastia, 100 miles; from Corsica to St. Teresa, Sardinia; from Marseilles to Algiers, across the Mediterranean, 800 miles, and from Antibes to Corsica, 250 miles.

The Russian government has cables in the Caspian sea, 250 miles, and along the Black sea.

The Italian government has several short cables, such as Orbitello to St. Teresa, Sardinia; from Otranto to Vallona, etc.

The cable companies who have their headquarters in London are as follows:

1. *Submarine Telegraph Company.*—1, cable from England to Emden, Germany, 224 miles; 2, from Lowestoft, England, to Zandvoort, Netherlands, 120 miles; 3, from Ramsgate to Ostend, Belgium, 76 miles; 4, from Dover to Pannes, Belgium, 47 miles; 5, from Dover to Calais, 23 miles; 6, from Folkestone to Bologne, 24 miles; 7, from Beachyhead to Dieppe, 53 miles; 8, from Beachyhead to Havre, 70 miles; 9, from Jersey to Conteances, 21 miles.

2. *Eastern Telegraph Company.*—1, cable to Falmouth; 2, to Vigo; 3, to Lisbon; 4, to Gibraltar, together, 1,318 miles; 5, from Gibraltar to Malta, 1,120 miles; 6, from Marseilles, France, to Bona, 448 miles; 7, from Bona to Malta, 378 miles; 8, from Otranto to Zante, Greece, 187 miles; 9, from Syria to Chio, 94 miles; 10, from Zante to Candia, 238 miles; 11, from Candia to Rhodes and Alexandria, 360 miles; 12 and 13, two cables from Malta to Alexandria, 920 miles; 14 and 15, two cables from Suez to Aden and Bombay, together, 3,278 miles; 16, from Trieste to Corfu, 600 miles.

3. *Mediterranean Extension Telegraph Company.*—1 cable between Sicily and Malta, 60 miles; 2, from Otranto to Corfu, 34 miles.

4. *Direct Spanish Telegraph Company.*—1, cable from Lizard Point to Santander, Spain, 530 miles; 2, from Marseilles to Barcelona, 220 miles.

5. *Black Sea Telegraph Company.*—Cable from Odessa, Russia, to Constantinople, 365 miles.

6. *Eastern Extension Company* (London).—1, cable from Madras to Pennang, 1,408 miles; 2, from Pennang to Singapore, 400 miles; 3, from Singapore to Saigon, 620 miles; 4, from Saigon to Hong Kong, 975 miles; 5, from Singapore to Batavia, Java, 557 miles; 6, from Java to Port Darwin, Australia, 1,082 miles; 7, from Melbourne to Lowehead, Tasmania, 176 miles; 8, from Botany Bay, Australia, to Nelson, New Zealand, 1,283 miles.

7. *West Indies and Panama Telegraph Company.*—1, from Cuba to Jamaica; 2, from Jamaica to the Isthmus of Panama, together, 790 miles; 3, from Jamaica to Porto Rico; 4, from here to Guadaloupe; 5, to Dominique; 6, to Martinique; 7, to St. Lucie; 8, to St. Vincent; 9, to Barbadoes, together, 1,341 miles; 10, from Porto Rico to St. Croix, 120 miles; 11, from St. Croix to Trinidad, 550 miles; 12, from Cayenne to Brazil, 1,080 miles.

8. *Western and Brazilian Telegraph Company.*—1, from Para to Pernambuco; 2, from Pernambuco to Bahia; 3, from Bahia to Rio Janeiro; 4, from Rio Janeiro to Santos; 5, to Santa Catarina; 6, to Rio Grande, Brazil; 7, to Maldonado, Uruguay; 8, to Montevideo; 9, to Buenos Ayres; together, 3,782 miles.

The following have their headquarters in New York:

9. *Anglo-American Telegraph Company.*—Four cables from Valencia, Ireland, to Heart's Content, Newfoundland. 1, the cable of 1865, 1,896 miles; 2, cable of 1866, 1,852 miles; 3, cable of 1873, 1,900 miles, 4, cable of 1874, 1900 miles; 5, cable from Land's End, England, to Brest, France, 101 miles; 6, from Brest to St. Pierre (cable of 1869), 2,584 miles; 7 and 8, two cables from Newfoundland to Sidney, Cape Breton, 300 miles; 9, cable from St. Pierre to Duxbury, U. S., 749 miles.

10. *Direct United States Cable Company.*—One cable from Ballinskellig, Ireland, to Nova Scotia and Rye Beach, U. S., 3,040 miles.

11. *Cuba Submarine Telegraph Company.*—1, from Punta Rassa, U. S., to Key West, 120 miles; 2, from Key West to Havana, 125 miles.

12. *Central & South American Telegraph Company.*—1, from Vera Cruz to Coatzacolcos, Mexico, overland to Salina Bay, at the Pacific Ocean; then, 2, to San Jose; 3, Salina Bay; 4, to Punta Malo; 5, to Buenaventura; 6, to Elena, Ecuador; 7, to Payta, Peru; 8, to Chorillos, near Lima; together, 3,095 miles.

The following have their headquarters m Copenhagen, Denmark:

13. *Great Northern Telegraph Company.*—1, cable from Sonderwig to Newbiggin, England, 334 miles; 2, from Hirsthals to Newbiggin, 429 miles; 3, Ekersund, Norway, to Peterhead, England, 266 miles; 4, from Fano, Denmark, to Calais, 377 miles; 5, from Hirsthals to Avendel, Norway, 66 miles; 6, from Moen, Denmark, to Bornholm and Liebau, Russia, 310 miles; 7, from Grissletan, Sweden, to Nustad, Russia, 96 miles; 8 and 9, from Wladiwortoch, Siberia, to Nangasaki, Japan, and from Nangasaki to Shanghai, China, together, 1,250 miles; 10 and 11, from Shanghai to Amoy and Hong Kong, 950 miles.

To these must be added some smaller companies, with headquarters at various places.

14. *United German Telegraph Company*—One cable from Grietsiel, near Emden, Germany, to Valentia, Ireland, as a supplement to the cables of the Anglo-American Company, 894 miles, including 11¼ miles of an underground cable from Emden to Grietsiel.

15. *Brazilian Submarine Telegraph Company.*—1, from Lisbon to Maneira; 2, from Madeira to Cape Verde Islands; 3, from Cape Verdes to Plemanbuque, Brazil, together, 3,866 miles.

16. *Cable Company of Peru.*—Cables from Valparaiso, Chili, to Iquique, Arica, Islay, Honolulu and Lima, Peru; together, 1,670 miles.

17. *Westward of America Telegraph Company.*—Cables of Chorillos, near Arica, Antopogarta and Valparaiso; together, 1,700 miles.

A further rapid extension of existing lines, and the laying of new cables can with certainty be expected.

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THE MUTUAL UNION TROUBLE IN CHICAGO.

The summary conduct of the Mayor of Chicago in cutting the Mutual Union wires proved about as detrimental to the business interests of that city as to the operations of the Mutual Union. The people of this city, for instance, would not tolerate for a single day any such assinine proceeding as would involve the isolation of New York from the rest of the world, as far as telegraphic communication might be concerned. Overhead wires may be a nuisance, but they are superior to no wires at all, and when an over-zealous city cuts them down, it is simply going through the time-honored form of cutting off its own nose to spite its face. We are not surprised, therefore to learn that the deadlock between Chicago and the Mutual Union has been broken, and that an agreement has been entered into between the city and the company by which the latter will be permitted to reunite its severed wires. The agreement stipulates that the Mayor shall have the right, at his option, to cut them again; that the company shall apply to the City Council for an extension of its privileges, and shall proceed to gather its wires into cables and string them on short poles pending preparations to put them under ground. There is a gleam of commonsense in that.

On Saturday last, the 10th inst., Judge Drummond, of the U. S. District Court, rendered his final decision in the case of the Mutual Union Company. The cutting of the wires by Mayor Harrison, as recorded in our last issue, and the threat to treat the Western Union wires in a similar manner on the first of May next, excited much interest, and a large number of telegraph people and lawyers assembled in court to listen to Judge Drummond's decision. The Judge had put his conclusions in writing, and covered the subject so fully that it took him over half an hour to read his opinion from the manuscript. He prefaced his findings with an exhaustive review of the facts in the case, with which readers of THE OPERATOR AND ELECTRICAL WORLD are already familiar. He said he was not disposed to change his opinion, previously expressed, that Mayor Harrison exceeded his authority when he cut the company's wires, and reiterated the assertion several times, saying: "Although the bond which was a part of the contract with the Mutual Union Company gave the Mayor authority to terminate the contract at any time, yet he could only do so by suit. If the contract had expressly provided that the Mayor might remove the company's wires and poles when it terminated, then it would have been lawful for him to do so without going into court for authority, but it did not. Neither did his official position give him such authority, for it is not the province of the Mayor to expound contracts which the city has made, and enforce the penalty of supposed violation."

Taking up the question whether, if the plaintiff shall proceed to restore its connections, the Court would restrain the city from interfering, Judge Drummond said:

"The only effect would be to enable the plaintiff to do an act after the authority for it had ceased to exist. Whatever might be the facts in regard to underground telegraphy, which plaintiff alleged to be impracticable, the Court is clearly convinced that the company's rights in the city had terminated by the elapse of time. There is no right on the part of the city and no obligation on the part of the executive which springs from the unlawful act done by the Mayor. The company's rights here are dependent simply upon a license on the part of the city, which has elapsed. For the wrongful act which the Mayor has done he is liable."

The Court overruled the point which had been made by the plaintiff that the telegraph company had a right in the city under the Act of Congress allowing post routes to be used in that manner under certain conditions. He was positive that municipal corporations have a right to determine on what terms a telegraph as well as a railroad shall enter or pass through its territory. If the proper notice had been given the telegraph company and the Mayor had acted under special authority conferred by Council, he would not have done wrong to cut the wires.

In conclusion, Judge Drummond said that, while in strictness of law he could not issue an injunction to prevent interference while the company replaced the wires which are cut, yet he could not but say that so long as the city used the same poles for its fire-alarm wires and permitted other telegraph companies to use poles, it showed an unjust discrimination against the Mutual Union Company. He expressed a hope that there would be reason and sense enough in the City Council to permit the plaintiff to use poles so long as other corporations are permitted to do so; yet, as a citizen, he was heartily in favor of removing the unsightly wires and poles from the streets.

City Attorney Grinnell assured the court that the city authorities were disposed to treat the Mutual Union with the utmost fairness, but while it occupied the attitude which it had taken in court, no negotiations could be entered into with a view to permitting it to use poles. This fight was only the beginning, he said, of a war with the telegraph companies. The Judge drily remarked that the position of the litigants was now changed, and he saw no reason why an agreement could not be reached.

Judge Trumbull, representing the company, presented an order enjoining the city from interfering with the wires and poles of the company as they now are, which Judge Drummond approved, as he had previously agreed to do.

The good advice given to the litigants by Judge Drummond seems to have had a favorable effect, for the Mayor soon afterward promised to reconsider the whole affair. Finally, an agreement was entered into between the City of Chicago and the Mutual Union Company permitting the latter to reunite and use its wires, and that, pending preparations to put them underground, they shall be bunched into cables and strung on short poles.

ONE of the daily papers of this city contains the following sensational article:

"News comes from France that M. Deprez, a well-known electrician, has discovered a means of transmitting power by electricity. At a recent public trial of his system he sent six horse-power to a point twelve miles distant and ten horse-power to another twenty-one miles distant over an ordinary iron wire. The loss of power en route was in each case fifty per cent., or, in other words, one-half the power applied at one end was recovered at the other.

"The future possibilities of this discovery cannot be overestimated. By its application the power developed by a running stream or waterfall may be gathered and brought by telegraph to the heart of a populous city, where fuel is dear and used to turn the shafting of factories and to light streets and dwellings. Power generated by steam at the coal mines, where fuel is cheap, may be sent to distant points which, being off the line of the railroad, have hitherto been supplied with coal only at exorbitant rates. A large manufacturer in New York could utilize the power of a waterfall in the Catskill Mountains for the purpose of turning the shafting of his mills. Professor Siemens, after visiting this country, made an address before the Glasgow University upon this subject. Speaking of America and her water-courses, he said that the day was not far distant when the power of Niagara Falls, far greater than that of all the mills in this State, would be distributed from city to city by means of electricity, and the great force at present running to waste would take the place of the steam now generated by the daily combustion of hundreds of thousands of tons of coal. His idea was that the power generated by the falls of the Niagara River should be made to turn turbine wheels, and these be connected with large electric generators. The electricity thus developed should be gathered and sent down through the middle of the State by means of a great cable, or, more properly speaking, an electric main. Thus the entire power required to run all the factories in the State might be taken off by tapping this main at various points."

Our comments on the above are that more detailed and correct reports which we have received inform us that the two machines were not placed at a distance twelve miles apart, but in one room only 12 feet apart. Although the current went over a loop of telegraph wire 12 miles long, going out and returning, the other wire closing the circuit was a very thick, well insulated copper wire, only 12 feet long. The experimenters considered the latter as an earth connection, without resistance. We would like them to make that wire actually an earth connection, and we are satisfied that the results would be quite different; this short wire became the actual current conductor, while the long wire became an unexpected earth connection; the arrangement will work better, the worse the insulation of the same. Cutting both ends of the long wire and making earth connections from both machines, using the short wire alone, would not make much difference, proving the fallacy of the whole experiment.

THE following item is going round the press:

"The Rev. Mr. Gilbert, during an address at Christ Church the other night, remarks the Otago *Times*, while speaking of the telephone, asked his audience if they would be astonished if he were to tell them that it was now proved to be possible to convey by means of electricity vibrations of light—to not only speak with your distant friend, but actually to see him. The electroscope—the name of the instrument which enabled us to do this—was the very latest scientific discovery, and to Dr. Gnidrah, of Victoria, belonged the proud distinction. The trial of this wonderful instrument took place at Melbourne on the 31st of October last in the presence of some forty scientific and public men, and was a great success. Sitting in a dark room they saw projected on a large disc of white burnished metal the racecourse at Flemington with its myriad hosts of active beings. Each minute detail stood out with perfect fidelity to the original, and as they looked at the wonderful picture through binocular glasses it was difficult to imagine that they were not actually on the course itself and moving among those whose actions they could so completely scan."

If it was said that the picture seen upon the white surface was projected from a painted glass slide of a stereopticon, worked by an electric light, we would believe in this "seeing by electricity," but evidently everything has not been stated, and a misunderstanding in rewriting transformed the report into an imaginary wonder. The basis of a suspicien is the binocular glasses mentioned. If it were a reproduction of actual bodies, binocular glasses would not be required; if it were painted pictures, as in the stereocope, binocular glasses would be in place.

THE remarkable floods in the West last month afforded a rare opportunity for telegraphic employés of all grades to give one more proof of their fidelity and efficiency. This was done and proved by the almost continuous and unbroken telegraphic communication maintained throughout the deluge. Operators sticking to the key while the waters welled in three feet deep through the door, messengers delivering messages in boats, and linemen wading waist-deep to repair breaks, afford examples of discipline creditable alike to themselves and the organization which employs them. Such men should be encouraged. The calamity has also afforded us another example, similar to that given during the yellow fever epidemic, of the readiness with which the telegraphic profession furnishes substantial aid to such of its members as may be overtaken by misfortune. The Telegraphers' Flood Fund, like the Yellow Fever Fund, was a spontaneous movement, and served to alleviate suffering as well as tightening the bonds of friendship which already exist in the craft.

ON Monday last, the 12 inst., argument took place before the Superior Court, General Term, on the appeal of the Western Union Telegraph Company from the orders of Judge Arnoux, in the suits of William S. Williams and Rufus Hatch restraining that corporation from paying dividends upon its shares to the par value of $15,526,590, distributed by it among its stockholders as a stock dividend, at the time of the American Union consolidation. On Tuesday Mr. William M. Evarts, who has recently been retained by the Western Union, closed the argument for that company. He claimed that the Court had no power to grant such an order at the instance of one or two stockholders who had a remedy for any injury by an action at law. The injunction, he contended, would work irreparable loss to the other stockholders, and certainly the creditors of the company were not injured by the distribution of the stock. Mr. Whitehead made a brief reply and the Court took the papers, reserving decision.

THE statue to the late Professor Henry will be unveiled at Washington on the 19th of April. In deference to the simplicity that characterized the life of the deceased, the details of the occasion will not be elaborate, and will consist of an oration by President Noah Porter, of Yale College. The statue is the work of W. W. Story, whom Congress specially named in the law appropriating $15,000 for it. Besides the members of the National Academy, President Arthur and his Cabinet and committees representing Congress, as well as other distinguished persons, will be present. The figure is bronze, seven feet high, and represents the late professor standing in a meditative attitude,

one hand resting upon a support, the whole effectively and gracefully draped in an academic gown. The pedestal is of red beach granite, and the base and top of Quincy gray granite. The red granite is polished and bears upon its surface in clear cut Roman letters the simple inscription, "Joseph Henry."

THE unveiling of a statue of the late Professor Joseph Henry at Washington on the 19th of next month, will be an event of much interests to all students of science, and particularly the science of electricity. The tidal wave of scientific investigation which has been flowing irresistibly onward for the last half a century has brought with it a class of scholars who have made the age what it is—freer, wider, grander than any other period in the world's history. Foremost among these thinkers and workers was Joseph Henry. His claims as the original inventor of the telegraph have been stoutly advanced, and not without fair reason, for it is not denied that in leading up to the main idea—the electro-magnet—he did as much as any other man of his day. The name of Professor Henry should be carved in electrical annals beside that of Professor Morse.

THE announcement that the operators in the British postal service are again dissatisfied with their lot reminds us that when, in April, 1881, the English operators sent a delegation to the Postmaster-General to protest against certain grievances the delegates were armed with the following business-like document, duly signed by every man represented: We, the undersigned, hereby pledge ourselves, individually and collectively, and unreservedly, to support the committee in any and every action that they may deem advisable for the attainment of our just claims and the protection of our just interests." We remarked at the time, two years ago, that there was something *striking* in that kind of talk, and it had a wonderful effect.

THE universal storm predicted by Wiggins failed to manifest itself, but the scare, while preventing many fishermen from making a few honest pennies, gave rise to a good deal of telegraphing. The fact of every wind, fair or ill, bringing grist to the telegraphic mill has been commented on before, such as every time the Czar is shot at congratulatory telegrams—principally sent collect—pour in upon him to the extent of about five thousand dollars worth. But the delicate hinge upon which the public's telegraphic business hangs could not be better illustrated' than by the fact that a roaring absurdity like Wiggins can create a visible increase in its volume.

DISCONTENT is again becoming apparent among the operators in England. Mr. Fawcett's scheme of revision, made two years ago, does not appear to have worked very well, and we now hear of operators' meetings in Edinburgh, Liverpool, Southampton, Exeter, Belfast, Newcastle and other places, and the adoption by them of resolutions setting forth their "grievances."

A GENERAL telephone law, aimed principally at the Bell Company, is being advocated in Massachusetts. Voluminous petitions from prominent persons and firms, setting forth that the American Bell Company is arbitrary and grasping, and asking for a general telephone law, have been presented to a committee of the Legislature.

A DISPATCH dated Wednesday last says that the American Bell Telephone Company has declared a subscription privilege valued at $45 per share, allowing shareholders to subscribe for one new share at par for every three shares held. The stock has advanced in price in consequence.

THE remarkable success attending the telephone experiments made this week between this city and Cleveland, Ohio, 750 miles by wire, will give an impetus to the subject of long-distance telephoning. "Hello, New York!" "Hello, Chicago!" may soon be familiar greetings.

ELECTRICAL progress in Spain has given rise to a new electrical journal, *L'Electricidad*, of Barcelona. It will be published twice a month, and will herald the news of the electrical world in the purest Castilian.

THE completion of the telegraph line on the Pensacola & Atlantic Railroad, gives Marianna, the capital of Jackson County and one of the oldest towns in Florida, telegraphic communication.

IT may be interesting to consolidating companies to read that a committee of Congress refers to the compact by which the Mutual Union was swallowed up as an "alleged lease."

THE bill escheating the property of consolidating telegraphic companies, which has passed the Pennsylvania Senate, has been favorably reported to the House.

THE Western Union dividend of seven per cent. per annum, instead of six per cent. as heretofore, is a sign of unusual prosperity.

THE new steamer Pilgrim of the Fall River Line, the argest steamer plying on the Sound, is to be lighted with 860 electric lights.

Fundamental Principles of Electrical Science.

BY PROF. P. H. VANDERWEYDE, M. D.

No. 2.

We do not wish to be understood as intending to write a history of Electrical Science. This would be rather beyond the scope of this journal, which aims to be as much as possible practically useful. Therefore, references to historical data will mostly be made when they have a practical bearing; and at the same time they will be a guide to the order in which the various branches are to be treated.

We will also attempt to make these articles a guide to those who, having taught themselves experimentally, may benefit the circles in which they live, by diffusing correct knowledge of a science about which the most absurd notions prevail. They may thus prepare themselves to give lectures in one of the most fascinating branches of science. For some forty years this was one of the occupations of the writer of the present articles.

FIRST EXPERIMENTS.

Two thousand five hundred years ago Thales discovered the attractive power of rubbed amber.

In order to show this experiment satisfactorily, it is well to have two stands (see Figs. 1 and 2). Fig. 1 consists of

FIG. 1.

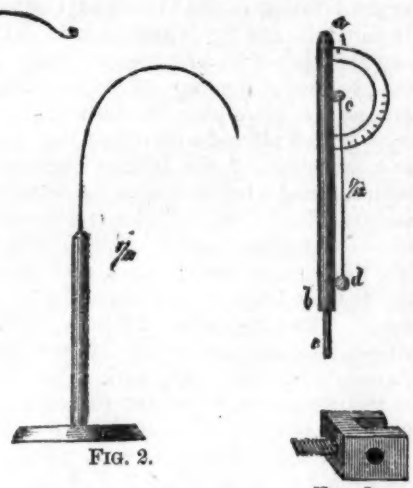

FIG. 2.

FIG. 3.

a wooden base, supporting a brass wire bent as shown in the figure. Fig. 2 is a similar stand, but the curved brass wire is insulated by an intervening piece of glass tubing; they are six to eight inches high, and are here represented on a scale of one-fourth—the most convenient size.

Fig. 1 is intended to suspend a little cork ball on a linen thread three inches long, while Fig. 2 is intended to suspend a similar ball on a silk thread. It is seen that Fig. 1 furnishes a non-insulated suspension, while with Fig. 2 it is insulated.

We are thus careful in the details of the most simple arrangements, because it is essential in electrical studies that from the beginning we be particular to have all the conditions properly arranged, so as to attain correct results and come to correct conclusions.

As amber is an expensive material, we may dispense with it by using a piece of sealing wax, rosin or sulphur, rubbing it with the hair of a piece of cat-skin, flannel or similar substance.

There ought always to be selected for the experiment a dry room and a dry day, as in moist rooms or rainy days it is almost impossible to obtain any results, because moist air is a good conductor of electricity, and carries it off as soon as developed. Not only the air and the apparatus should be dry, but also the hand manipulating the same.

It will be seen that the rubbed sealing-wax will at first attract both balls, but the non-insulated ball suspended on the stand, Fig. 1, will always be attracted, while the insulated ball suspended on stand, Fig. 2, will first be attracted, and after contact be repelled.

This illustrates a most important fundamental property of electric force, namely, that an electrified body always attracts a non-electrified one, because the suspension by Fig. 1, being non-insulated, makes it impossible to draw that body; the suspension by Fig. 2, being separated from the table by insulatory material, glass and silk, allows the electric charge communicated by contact to be retained in the cork ball, so that we have here two equally charged electrified bodies, which will be seen to repel one another, proving the second electric law, that equally charged bodies exert a mutual repulsion; the law seems to have been discovered by Musschenbroeck, of Leyden, Holland, as he appears to be the first who mentions it in his Elements of Natural Philosophy, printed in 1739.

The electrometer, Fig. 3, is based on this repulsion. It is intended to be placed on an electrified body, and consists of a wooden rod *a b*, with a graduated semi-circular scale on top, from the centre of which a very thin wire is suspended, which carries a small pith ball *d* at its lower end. The support of this wire is represented in its natural size, under the reduced representation of the whole apparatus. In proportion as the charge is strong the repulsion will be greater, while the amount of this repulsion is estimated by the degrees marked on the semi-circle, which may be made of thick paper, or better, ivory or any other suitable material.

The mutual repulsion of electrified bodies is also well illustrated in the manner suggested at the close of our first article, page 147, by suspending two cork balls by a linen thread on the apparatus, fig. 2. In that case the electric charge will be equally diffused over the balls, thread and brass wire supporting it, and we will see the mutual repulsion, which, when left alone, will slowly disappear, as the cause of it, the electric charge, will gradually be carried off by the surrounding air.

We also see here illustrated the other fundamental fact, that bodies are electrically divided into two kinds, those who conduct electricity and those who do not, and are called insulators.

The subject was first investigated by Gray, in England, in 1728, and has now progressed so far that we are able to give the following table in which the first-named bodies are the best conductors, those in the middle of the series imperfect conductors, and the end of the series non-conductors or insulators:

Silver, copper, iron and other metals; carbon, graphite, red hot glass, solutions of acid and salts in water, pure water, moist snow, vegetables, animals, moist air, soluble salts, linen, cotton, alcohol, ether, powdered glass, flowers of sulphur, ordinary dry wood, ordinary paper, dry ice at 32° Fah., dry oxids, very dry ice at about 0° Fah., lime, soft rubber, dry air and dry gases in general; dry paper, petroleum, silk, diamonds and precious stones, glass, wax, solid sulphur; resin, hard rubber, paraffin, amber, shellac.

It should be remarked here that we must credit all our knowledge of electricity to the fact that dry air is a non-conductor. If this were not the case, and if the air were a conducting substance, the electricity would always be carried away as soon as developed, and mankind would have remained in utter ignorance of the existence of such a power. Not this alone, but man would be utterly incapable of forming any idea of the same, and even would not be able to conceive the possibility of an agent which he now has actually harnessed into his service, though after all without understanding its essence or nature. The latter appears to be reserved for posterity. The most recent advancements of our knowledge in regard to the subject justifies the strong hope that such may be the case.

Query: Are there not perhaps other forces of which we cannot obtain any knowledge nor form any conception, for the reason that the circumstances in which we are placed in this earth make their discovery difficult, if not impossible?

Spiritualists are welcome to make use of the latter suggestion.

The Floods in the West.

At Indi anapolis, Ind., on the evening of Feb. 29, a meeting of telegraphers was held to take action respecting those of the fraternity who had suffered by the recent flood. A working committee was appointed, consisting of Messrs. M. D. Fuller, chairman; T. W. Samuels, secretary; S. L. Douglas, treasurer; and Frank Farrell.

As it was known that the Indiana side of the river had suffered to a far greater extent than the Ohio side, it was, after a long discussion, decided to make it a State affair, and a telegraphic circular was sent to every telegraph office in Indiana requesting immediate help. The gratifying result is well attested in the list of subscribers sent us, but which we have not space to copy. The amount collected, $270.25, was distributed as follows:

Manager Biggert, Jeffersonville, Ind	$100.00
Manager Rolfe, Lawrenceburg, Ind	75.00
Agent Hayes, O. & M. R. R., Lawrenceburg, Ind	45.00
Miss Benham	40.00
Expenses	2.15
Total	$262.15

Leaving a balance of $8.10 in the treasury.

Miss Benham and Messrs. Biggert, Rolfe and Hayes desire to return thanks to the operators of Indiana and elsewhere for their kindness, and they sincerely hope that no midnight warning shall ever arouse them from their sleep to flee for their lives; to find on their return, after a week's absence, a complete wreck where was once a happy home. There was a depth of eleven feet of water in manager Rolfe's house at Lawrenceburg; nine feet in Mr. Hayes', and it reached to the ceiling in Miss Benham's.

Manager Biggert, of Jeffersonville, Indiana, writing on the 3d inst., says: "On Sunday, February 11th, I remained in my office receiving river items from Cincinnati and way points. I had Lawrenceburg, Ind., between 11 and 12 o'clock, and asked him what the river was doing there. He said it lacked *one inch* of being up to his *floor;* would set a mark and let me know if rising. He returned in about half an hour and said the river had risen *half an inch* in *twenty minutes*, and was then rising about two inches per hour. I did not hear Lawrenceburg again until about nine days afterward, when he told me the water had come up into his office about eight feet, which I suppose is one reason that the wire would not work to Cincinnati.

"On Monday and Tuesday nights I had to be taken home in a boat. On Wednesday morning there were three inches of water on my ground floor. Still I took shipping and came to the office, thinking surely it would begin falling that day, but on the contrary it continued to rise. I could not get home that night, as dispatches were coming in rapidly from those inquiring for their friends here. The city authorities also commenced telegraphing to the different cities relative to the destruction already accomplished and to that which was threatened.

"On Wednesday night and the five following nights I

had to bunk in my office, being kept busy until twelve or one o'clock, and unable after that hour to get a boat to go home. My messengers and one of my sons had to put up with the same accommodations; namely, tables and chairs. Our meals, part of the time, we had to get as best we could from a neighboring house, and during the latter part of our incarceration they were sent to us by the Relief Committee. My greatest trouble was about my wife and younger children. The water was, as near as I could learn, over three feet deep in my house, and I was, as you may well suppose, considerably worked up. I had no relief, and could get none.

"I wish also to mention my delivery force—Tom White, John Rail and my son James. Out of at least 500 messages received from all parts of the country addressed to people, many of whom had been obliged to leave their houses, we delivered *all* except four or five, which yet remain and have not been claimed. The delivery had to be done by boat. There was no place found to stand or walk on. Many of those to whom messages were addressed were found in boats hunting for a dry place. Many others were found in exactly contrary directions from those given in the address.

"To any one who was not here to see the extent of the flood it would be difficult to describe it so that he could properly appreciate it. To me, at this date, when I look out of my window at the dry streets, the stores open and the people passing as usual, it seems more like a horrid dream, a hideous nightmare, than a stern reality. I can scarcely realize, although I saw and experienced it, that the water was three feet deep in this (Spring) street and that it was out of the question to get around without a boat. It was Venice reproduced."

Our correspondent speaks highly of the generosity of the telegraphers of the State who came promptly to the aid of the sufferers. "Tim" Cleary, the lineman, also receives well-merited praise, since he worked waist deep in water keeping up communication. David S. Barnum, a boat builder, was also conspicuous by his kind attentions to the telegraphic force.

The International Electric Exhibition at Vienna.

The printed regulations and blank forms are being distributed by the Austro-Hungarian Consulate of this city to those who desire to contribute to the International Electric Exhibition to be held in Vienna between Aug. 1 and Oct. 31 of the current year. The exhibits are to be divided into the following eighteen classes, according to the principle which they embody:

Class I.—Magneto-electric and dynamo-electric machines.
Class II.—Galvanic cells, batteries, accumulators, thermo-electric piles.
Class III.—Scientific apparatus, instruments for electrical measurements, electro-static apparatus.
Class IV.—Telegraphs.
Class V.—Telephones, microphones, photophones.
Class VI.—Electric lighting.
Class VII.—Transmission of power.
Class VIII.—Cables, wires, conductors.
Class IX.—Application of electricity to chemistry and metallurgy.
Class X.—Application of electricity to war.
Class XI.—Railroad electrical appliances.
Class XII.—Application of electricity to mining, navigation and agriculture.
Class XIII.—Electro-medical apparatus.
Class XIV.—Application of electricity to automatic registration, to horology, meteorology, astronomy and geodesy.
Class XV.—Miscellaneous.
Class XVI.—Application of electricity to domestic use, art-industry and decoration.
Class XVII.—Application of machinery to electrical industry, boilers, steam, gas and hydraulic engines.
Class XVIII.—Historical collections. Method of instruction. Bibliography.

Applications for space must be made immediately, but exhibitors will not know what space has been allotted to them until the first day of May. Goods will be received at the Rotunda as early as June 1, and all exhibits must be unpacked and set up by July 15, and removed one month after the close of the exhibition. No prizes will be awarded. Foreign exhibitors will be exempt from duties, and every one will be under the protection of the patent laws from the beginning until the end of the display.

It is not yet known how many exhibits will be made from the United States but there will probably not be many, compared with the exhibits at the Paris Exposition.

The Western Electric Company, however, will send a large and thorough collection of electrical objects to Vienna, including telephone and telegraph instruments of all kinds. A special point will be made with the telephones, which have been manufactured for the purpose and are nickel-plated and very handsome. Among the articles to be sent are:

Telephonic: Blake transmitters. Edison transmitters. Bell receivers. Pony crown receivers. Magneto call bells of every kind. Central office switch.

Telegraphic: Morse instruments. Duplex apparatus. Quadruplex apparatus. Cables, aerial, subterranean and submarine. Automatic fire apparatus. District call boxes. District call apparatus. Electric annunciators and bells.

The company will also send exhibits from their branch factories at Antwerp.

Mr. Edison will not exhibit at Vienna. The United States Electric Light Company have the matter under consideration.

Progress of Electric Railroad Signals.

The Pennsylvania Railroad Company has signed contracts with the Union Switch and Signal Company, of Pittsburg, for supplying important points on that road with interlocking switches and electric signals. The extensive yards of the Pennsylvania in Philadelphia are being supplied with the complete system, and also fourteen miles of four-track road from Fourteenth street to Overbrook are to be fitted up with the electric signals as well as with the interlocking switches, seven interlocking machines being required in that distance. The New York division is protected at Kensington Junction by the same appliances. There are two towers on the Philadelphia, Wilmington & Baltimore line, and electric signals have also been put in at Chester station and Eddystone. The Switch and Signal Company is now preparing estimates for other work along the line of the Pennsylvania Railroad, including four large machines, and in time the entire road will be protected.

Some work is also under contract for Western roads, notable among which is the largest interlocking machine in the world, to be operated on the hydraulic system, and to be put in at East St. Louis. An experimental station has for two months been in operation at Wellington, O., at the crossing of the Cleveland, Columbus, Cincinnati & Indianapolis and the Wheeling & Lake Erie railroads, and an exhibition of its workings was made a few days ago in the presence of the Railroad Commissioner of Ohio and a number of prominent Western railroad officials. They were so well pleased with it that they united in a telegram to a committee of the Indiana Legislature to which had been referred a bill similar to the law now in force in Massachusetts and Ohio, allowing trains to run across crossings at speed where the roads are supplied with a system of signals like this. Stimulated by such an indorsement of the law, the Indiana Legislature adopted the bill, and it is now in force. The legislatures of Illinois, Michigan and Wisconsin are also considering bills of like purport, with every probability of their enactment. The railroad men are back of the movement to secure such laws, as under them a train can be run with safety from one end of the State to the other without stopping at crossings, as they are now compelled to do at great loss of time and money. It is estimated that fully five minutes are lost by every stop, and on long runs the waste of power is immense. On the Pittsburgh, Fort Wayne & Chicago Railway there are twenty-eight railroad crossings, and the loss of time to the fast trains on each run between Pittsburgh and Chicago is estimated at two hours and twenty minutes. Mr. George Westinghouse, the president of the company, has lately perfected some important improvements in the electrical apparatus, and will have them covered by patents at home and in Europe.

The Government and the Telegraph.

We learn from the *Herald*, of this city, that about three o'clock on the Sunday morning which saw the adjournment of the last session of Congress there was presented in the House of Representatives a document of great general interest, which has not as yet reached the public. This is the report of the Committee on Post-Offices and Post-Roads upon the various bills relating to the telegraph system of the country which had been referred to it for consideration. The report expresses the belief of that committee that there is at the disposal of the government, or of any corporation which shall receive the sympathy and recognition of the government, methods for transmitting telegraphic messages that would enable a reduction in cost of from twenty-five to fifty per cent. to be made. The committee holds that these enormously reduced rates "upon lines constructed on a cash basis would still furnish large returns on the capital so invested and yet greatly benefit the people of the country." Four different bills having for their object the cheapening of telegraphic service and the more effectual control of the existing companies had been referred to the committee in question. Two of these bills provided for the creation of a postal telegraph. A third called for the appraisement of the property and effects of companies under the act of July 24, 1866, which provided that Congress could at any time, after five years from that time, purchase at an appraisal any or all the telegraph property of the companies then existing which should file an assent to the provisions of that act.

Assent was subscribed by nearly all the companies, including the Western Union, which put the resolution of its Board on file in the Post-Office Department in Washington, June 5, 1867. The fourth bill confided to the committee was one "to authorize the appointment of a commission to examine into the telegraph service of the United States," and this they reported to the House amid the confusion of that Sunday morning, "with a favorable recommendation." This bill as amended the committee stated will aid more largely in securing the necessary and important information for safe and wise legislation upon a system of telegraph service under the supervision of the government than any of the others examined. The report of the committee was sent to the Committee of the Whole House on the State of the Union and ordered printed. The bill authorizes the President to select as members of the commission a certain number who were members of the recent House and Senate, and also members elect of the respective houses in the next Congress.

The Storage of Electricity.

The following in reference to the American Electric Storage Company, recently organized at Newark, N. J., for the purpose of introducing the electric reservoirs invented by Mr. N. S. Keith, the well-known electrician of this city, we extract from an article on the subject in the Newark *Daily Advertiser*:

Mr. Keith claims that two years before Faure secured his French patents, he (Keith) had discovered the principles of the storage of electricity, and that to him belongs the right of the invention. The patent asked for is not on the principle of electric storage, however, but on the process of constructing the reservoirs.

The Keith invention differs from the Faure and Brush principally by the use of pure lead plates in the reservoir, instead of red lead. The pure lead yields much more rapidly to the action of the electric current and the reservoir may be prepared for use in far less time. The reservoir will discharge ninety per cent. of the electricity it receives, and the inventor claims that the proportion may be made even larger. The system is now in working order at the company's office, No. 792 Broad street.

After the reservoir is once prepared for its work (which takes 40 hours with the Keith and 800 hours with the Faure) it needs nothing but the electric current, and thenceforth works as simply as a reservoir of water. It may be filled at ang time and to the full extent of its capacity, or it may be supplied with only enough electricity to keep the lamps running for a single evening. In factories furnishing their own supply of electricity to the reservoirs, the latter could be filled at odd moments when the power was not used for other purposes. The reservoirs are portable, and when supplied with electricity to any quantity desired may be detached from the supply wire and used anywhere. The stored electricity may be used not only for lighting, but for running sewing machines, turning fans, pumping water, etc. The current is governed by a key similar to that used for turning gas on or off.

The American Company does not intend to go into the lighting business itself, but will sell its licenses to other companies, which will apply the process practically.

How the Superintendent Stopped the Train.

An exchange tells the following story of General Superintendent Kimball, of the Chicago, Rock Island & Pacific Railroad:

"One morning the express had come into Davenport from the east and departed on its way to Council Bluffs. Mr. Kimball was seated in his office, when his operator rushed into the room, fairly white with fright, and said: An order came for No. 2 to stop on the double track for a live stock express, and I forgot to give it to the conductor!' There was a chance for a collision. Mr. Kimball glanced out of the window—a pony switch engine was on the track; out he dashed, leaped on the foot board and told the engineer to speed after the passenger train as fast as the pony could go—off they went, the engineer attending to his throttle and tooting the whistle every second as a warning on the street. Fortunately it was early and neither vehicles nor people had commenced moving down from off the hills—and so the pony fairly flew along Fifth street, with its alarming whistle, as if it sounded an alarm for a fire for which the engine was speeding. That engine made magnificent time, and the sound of the whistle was heard by the rear brakeman of the express, which was then climbing the grade as fast as its engine could haul it. The rear brakeman looked down the grade and saw the pony coming, and heard the puffs of the whistle, and the passenger train was brought to a stand, and it wasn't long before the stock express came thundering from the west, and rushed down the grade for Davenport. Mr. Kimball was a happy man. On walking into his office the operator coolly told him that he had telegraphed his resignation to Superintendent Swift, but he was not allowed to wait for his successor to arrive. He went at once, and an expert operator was borrowed to the end of his watch from the Western Union office."

Remarkable Long-Distance Telephoning.

Last Saturday experiments were made with the Gray Harmonic system and Dorrance telephone between Cleveland and New York over the heavy wire of the Postal Telegraph Company, which seem to have demonstrated the feasibility of connecting all the larger cities of the Middle and Eastern States by telephones. "Our wire is in great shape to-day," said the gentleman in charge of the Postal Telegraph at Cleveland, Ohio, "and if you will wait a few minutes you can probably have a talk with New York."

A few minutes later the telephone was attached to the main wire. "Hello, New York." "Hello, yourself," answered New York. "How do you get me?" "Very well. Do you know how far we are talking?" asked New York. "No, but they call it 650 miles here." "The men who put up the line say it is a good 700 miles," said New York. "Do you understand me?" was asked. "Yes, just as well as if you were only two blocks away; the articulation is perfect." Here the New York man stopped for a moment to fix the transmitter.

The removal and replacing of the diaphragm could be plainly heard by the reporter, who held the instrument to his ear. Thus far in the conversation not a word had been lost. Every syllable was as distinct as if coming from a phone across the street. Even the conversation of the men in the office could be plainly heard. "Hello, again," said New York, after a moment's delay. "Hello." "Am I talking to Mr. ——?" "Yes." "That's Cleveland, is it?" "Yes." "Well, just call your town to the telephone." "Our town?" "Yes; I want you to give them my regards." "Who shall I say called for them?" "Billy Stafford, an old Cleveland boy. There is another one here who will speak to you." The handing over of the telephone could be plainly distinguished.

"Hello, Mister." "Hello, No. 2." "Here's my regards to Cleveland, too." "Who shall I say they are from?" "H. F. Lutkin." "All right." "Good bye, Cleveland."

Mr. Dorrance will take his instrument to Chicago, and, when the Postal line reaches there, will attempt the feat of speaking 1,000 miles. Among the people who tried the experiment on Sunday were Cornelius Vanderbilt, at the New York end, and C. P. Leland, auditor of the Lake Shore & Michigan Southern Railway, in the Cleveland office.

Another exhibition took place, in this city, on Monday afternoon, when New York and Cleveland were again connected. Gentlemen in the office of the Postal Telegraph Company in New York spoke and sang before an improved telephone of the Baxter patent. A party in the Cleveland office did the same, and their voices were more distinctly heard in New York than is usually the case between connected telephones in this city. Prof. Elisha Gray conducted the experiments. He said the success was due to the superior conductivity of the compound wire in use, composed of a steel core surrounded by copper.

Mr. James R. Keene was one of the party, and conversed with friends who had been called into the Cleveland office to meet him. C. H. Rudde, an electrician in Cleveland, with a round, mellow voice, sang "The Sweet By and By" and "Auld Lang Syne," and his listeners in the New York office applauded him so heartily that he said they were jarring down the plastering in the Cleveland office. The musical efforts of the New York party were limited to a feeble attempt at whistling, which the Cleveland men said sounded like Wiggins's tempest. Telephones of other pattern were subsequently tried over the circuit with the same success.

He Wanted to Give Up Profane Swearing.

A good story, originally published about a year ago in the *Railroader*, has been forwarded to us by a friend and we find it enjoyable enough to bear reproduction in THE OPERATOR AND ELECTRICAL WORLD. It seems that a Lake Shore operator at Cleveland began the new year by resoluting not to use swear words on the line. He struggled through January and February manfully, bottling up and holding back the warm expressions that flew to his finger ends on exasperating occasions and letting it out Sundays and meal times and off hours; but when March came—when the first breath of the beautiful springtime stirred to æolian strains the tuneful wires, leveled some poles and crossed every circuit in his office he knew his hour of trial had come. He nerved himself with a slight allowance of "Mayflower" and tried No. 11—dead. No. 2 whizzed and jarred and sputtered, but wouldn't talk English. No. 5 had fits of fainting, banging like an anvil for a second and then dropping to an inaudible tap.

Messages began to drop in, some marked "Rush," others "Imp't," until his books were full. He turned his adjuster back and forth, scowled at his sounder and perspired, but couldn't reach any one or break circuit. An overdue train became the subject of inquiry and several insinuations of inefficiency on his part reached his ear. Finally he managed to catch Elyria on a chance adjustment and was telling him to open No. 11 and No. 3 when some wretched plug broke in and began to bang away in an execrable fashion after "RH." The Cleveland martyr opened his key and drummed and pounded to no avail while a look of intense suffering furrowed his features and a dangerous light shone in his eyes. He ran his fingers through his tangled locks and groaned.

The plug ceased after a time and Elyria was caught again, but before enough words could be said to make a clear sentence, Shawville broke and operations had to be abandoned until he had tired himself out calling "V." The Cleveland man gnashed his teeth, kicked over the waste-basket and almost screamed with rage. He tried to tell Elyria to make them adjust and couldn't, of course, and Elyria kept as mum as an oyster. When Shawville closed circuit, Brownhelm came in and woke up Sandusky, to whom he detailed bits of gossip and hinted on feminine conquests, while the Cleveland sufferer worked his key in vain and glared at a pile of delayed business with blood-shot eyes. Finally he captured Elyria and held him long enough to say, "Tell Shawville to adjust."

He got Shawville. A whirl of biting, angry oaths flashed through his mind and for a moment made his hand tremble so badly he couldn't speak, but he controlled himself and said, shortly, "Copy. Tell 'N.B. and R.H.' to adjust." Shawville did as requested and the Cleveland man broke loose. Two whole months of corked profanity rushed forth in the burning stream. He vituperated, execrated and abused those astonished fellows with the most condensed epitome of stalwart cussing that ever melted an insulator.

An Ingenious Machine for Starting Trains.

At the train-starter's tower in the Grand Central Depot, this city, there will shortly be placed a new machine, operated by clock-work, which is designed to do automatically what is now done by men employed as train-starters. The machine, of brass, copper and steel, occupies but little space, it being less than 2 feet in either length, breadth or height. The mechanism consists of three upright cylinders of brass, in which are punctured a series of holes, each representing one of the 1,440 minutes in the day. By the side of these are three smaller pillars, on which are fixed spirally pins representing the 24 hours of the day. The three pairs of pillars as they stand in the case represent respectively the three roads using the Grand Central Station—the Harlem, New York Central and New York, New Haven & Hartford. A series of springs are set so as to be operated upon by the two cylinders as they, each in turn, make their revolution in the 24 hours of the day. These springs connect with electrical appliances. The fixed pegs on the hour column and the movable pegs set into the minute cylinder, striking the arms of the spring, set the necessary bells ringing in various parts of the station. At 20 minutes before the leaving time of through trains bells are rung for the gates to be open. Fifteen minutes later they ring a warning "all aboard" in the passenger rooms, and in the baggage rooms notify the baggage master to have all his baggage on board the trains. At one minute before leaving time they ring to close the doors leading to the station, and they ring a minute later to start the train. All this is done automatically by this ingenious contrivance of clock-work and mechanism, and without the possibility of a mistake, unless the clock-work or electrical machinery clogs or breaks. The machinery adjusts itself once in seven days to the fewer trains that run on Sundays, and then readjusts itself for Monday's increased travel. All this signaling is now done by hand, the bells being rung by a system of bell-pulls. It is claimed that greater accuracy can be obtained by the use of this contrivance, and much labor saved. Its capabilities will be fully and severely tested in the trial which it will at once receive at the station There are now 198 trains arriving at and leaving the station each day in the week, except Sundays, when the number is but 48. During the summer the arrivals and departures on week days are increased by about 40 trains.

A New Telegraph Company.

The certificate of incorporation and articles of association of the New York Mutual Telegraph Company were filed in the County Clerk's office in this city on Wednesday last, March 14. The corporators of the new company are Wilson Godfrey, John H. Walker, William Yorke Atlee, George L. Record and David B. Waters, each of whom holds 200 shares of its capital stock, which is now $25,000, divided into 1,000 shares, but which, the certificate of incorporation provides, may be increased "at any time by the directors of the company, by and with the consent in writing of stockholders holding and owning three-fourths in amount of the then capital stock of the association." The general route of the line or lines of telegraph of the new company is to be "from the Stock Exchange and other exchanges in the City of New York through the States of New York, Pennsylvania, Ohio, Indiana and Illinois, and by way of the cities of Albany, Rochester, Buffalo and Cleveland to the city of Chicago, in the State of Illinois, and the points to be connected are the said Stock Exchange and other exchanges and the cities above named and the cities, towns and villages lying between the same." The corporators of the company, with Charles G. Hedge and Henry P. Johnes, are to be its directors until the first annual election, to be held on the last Tuesday of May, 1883.

His Dream.

A San Francisco correspondent sends us the following:

The other day I wandered into the battery room, where are accumulated on the shelves a lot of unused instruments, and scattered around the room the linemen's paraphernalia, and, being weary, I stretched myself out on the soft side of a carpenter's bench. While dozing there an old sounder on the shelf began sputtering, and said to itself: "Well, I am tired of lying here idle; if they don't put me to work soon I shall be so rusty I won't know the alphabet when they do set me clicking." "Wonderful to 'relate!'" exclaimed a polar relay in "icy" tones. "You have brought enough 'remorse' to the poor operators already; you should be glad to keep still, you brazen-faced thing!" "Hi! hi!" snickered the sounder, "Did I ever say anything that you didn't make me say?" Thereupon the relay and sounder "closed" in mortal combat. A pole-changer that had overheard the conversation rushed up and tried to break the connection, but he got in so late his efforts were useless, as the relay had paralyzed the sounder. Presently a cell of battery spoke up and said: "I vill go oud und 'copper' the ace vile the gates are 'ajar,' und I 'zinc' I vill vin." "I am 'positive' you will," said a spade in the corner, "if you bet on me." But the cell received from the big battery a "negative" to his request to leave. "We sigh for another 'clime'," remarked a pair of climbers, "and would leave to-night, if we were'nt 'strapped.'" Just then Jim, the lineman, came in, and was getting ready to set up some new battery, when a "kid" from Goat Island came tearing through the door with the announcement that the goats had eaten off two poles on the island, and he had discovered a wire-bug's nest in another pole, and Jim must come immediately and fix the line. Jim took three or four "glasses" and "reeled" up a coil of wire [in brackets], and was just going to "nail" his little hatchet, when the (ten-button) kid sang out: "Say, Jim, can you balance a quad?" This sobered Jim in a moment, and he replied: "No; but I have a sister Maud who can balance all." Without waiting to finish the sentence, he threw an old sign at the kid, the noise of which awakened me, and lo! it was a dream. The moral of this allegory is that if you don't like our style (us), you should get relief.

BALFOUR.

BINDERS FOR THE OPERATOR AND ELECTRICAL WORLD.

For the convenience of subscribers who desire to preserve their numbers of THE OPERATOR AND ELECTRICAL WORLD clean and neat for permanent binding or for handy reference, we have had made especially for this purpose a number of self-binders of the very best kind, handsomely bound in cloth. The binders are of the exact size for the paper, and each issue, as received, can be fastened in it securely without trouble. When the binder is filled it can, if desired, be permanently fixed

in a few minutes, making a volume almost equal in appearance to one specially bound. The cut above shows the appearance of the binder. Full directions accompany each one. The binder may be had at this office or by express (the receiver paying express charges) for $1.25, or will be sent postage prepaid, to any address, for $1.50. Address, W. J. JOHNSTON, Publisher,

No. 9 Murray street, New York.

To Manufacturers of Electro-Motors.

To the Editor of The Operator and Electrical World:

SIR: I see no advertisement in your paper of any firm manufacturing electro-motors or generators. While these machines are coming into such general use, I am surprised at not finding such an advertisement. I want twelve electro-motors that will develop ¼ H. P. each, when running at their ordinary speed, and I want a generator that will develop the electricity for them. The motors to be placed in *series*. They cannot be put in multiple arc. The engine to drive the generator to use steam at 100 lbs. boiler pressure. I would prefer a rotary engine connected directly with the generator. I will be glad to correspond with manufacturers.

SIOUX FALLS, Dak. D. J. MACPHERSON.

Reading (Pa.) Notes.

READING, PA., March 12, 1883.

To the Editor of The Operator and Electrical World:

The Lehigh and Mutual Union companies are still alive and doing a fair business. The lines of the former named will be extended to Philadelphia, Pottsville and Harrisburg during the coming summer. It promises to be a lively competing company in the course of a year between the above points.

Mr. H. W. Spang, formerly president and manager of the Eastern Pennsylvania Telephone Company, and at one time superintendent of the P. R. & P. T. Co., will in the course of a few weeks introduce a system of steam power and heating in this city, the intention being to lay pipes and electric conduits underground at the same time. It is understood he has the contract to light a portion of the main streets for the city.

NED.

READING, Pa., March 12, 1883.

Along the Line of the Mexican Central Railway.

To the Editor of The Operator and Electrical World:

SIR: The part of Mexico traversed by this road, thus far, is through the state of Chihuahua, from north to south. The country presents the most forlorn appearance of any I have ever seen. From Paso del Norte to this point it is as barren as a desert. There are but two towns along the road at present—Passo del Norte and Chihuahua. The other stations consist of simply a side track, with a box car or two for the section men, and another car which answers the purposes of depot and telegraph office. The company has commenced the erection of depots, and they will soon be completed at all stations. Chihuahua is a city of about 15,000 inhabitants, and is situated one and a half miles from the depot. The buildings are generally one story in height and are constructed principally of adobe. There are but few of the real Spaniards, or Castillians, in this part of Mexico. The prevailing idea in the "States" that Mexican women are very handsome is an erroneous one. The majority of them look like Indian squaws, but their dress is more in keeping with civilized customs. This is the last country on the face of the earth that I would advise an operator to come to; the salaries are small and

everything costs from three to four times as much as in the "States." Every one has to furnish his own bed. Meals in the boarding cars cost $30 per month, and miserable meals they are. This description is probably greatly at variance with most you have read, but it is a true statement of facts. DEL.

NEAR SAN PABLA, Feb. 21.

The "Universal" Alphabet.

To the Editor of The Operator and Electrical World:

SIR: After congratulating you upon your new title and the accompanying increase in the dimensions of your progressive paper, I beg space in which I may refer to "G. O.'s" remarks contained in your edition of December 30.

I think his opinion of the brains of his fellow operators must have been severely condemned by their owners. He says: "Their brains would not allow it"—speaking of the difficulties to be met with in learning the "Universal" alphabet. Difficulties are not always proportioned to all of us alike. What may appear almost insurmountable to "G. O." or myself, might, perhaps, be trifling to seventy-five per cent. of our fellow telegraphers.

The remarks of "G. O." respecting foreign words are traditional with good operators, who have got into a groove and persist in remaining in it. They would even dispute with Morse and Vail should they presume to appear in the flesh and recommend the "Universal." But how many *good* and *careful* operators do we meet with, whose work, you may rely, will be free of errors, which may arise from the weak parts of the original Morse, while being applied to the thousands of messages in foreign languages now daily arriving and departing from the United States? My observation places the percentage of operators fully alive to the case at a figure I am ashamed to record. At all events the majority will not treat foreign messages with the care they deserve nor will they apply proper care to those in their own language when letters such as I have before called attention to come together.

The "musical sound" of the Morse is freely admitted, but that fact should have little weight in allaying the victims of the "frite gerse" legion.

The object of the "Universal" is well indicated by its name, and in placing its merits before the fraternity my special view was to try and reach universality in its application. I am quite well aware that many objections may reasonably be made to its adoption, if not actual defects discovered, by persons judging it from a certain standpoint. I can point out a few weak or defective combinations when the alphabet is applied to many words in a certain language, but these disappear immediately that you extend its services more generally to three or four of the principal languages; and as I had in view making it as nearly right as I could manage for the latter purpose, I would express the hope that my critics will kindly bear in mind this explanation. Besides, it is scarcely the period for operators to allow their affection for the musical Morse to overcome their judgment and persist in perpetuating a notoriously defective alphabet. No argument can possibly prove to an unbiased mind that the spaced letters of the Morse alphabet are not exposed to the utmost degree of errors in their reception. Your many amusing accounts of "bulls" by some of the "artists" are alone an unanswerable proof of my assertion.

There is not as much difficulty to be encountered in learning the Universal as "G. O." would fain have his colleagues believe. Would he confess that an operator could not acquire another language besides his mother tongue? I think the simile is in favor of the Universal.

While I was a boy I worked the Morse and Bain instruments, in the same office, and found no difficulty in transmitting or receiving by sound at either, changing from one to the other fifty times a day; and although not blessed with a good memory I have not yet forgotten the Bain. I learned the latter in the year 1854, two years after the Morse.

Last year I had occasion to teach two young Central Americans the international alphabets. They had been Morse sound operators about three years. Within a week after their first studies they had mastered the alphabet so as to send quite freely. The week following they were sending and receiving in English, French and Spanish, quicker than I had ever heard them do with the Morse, and seemed to have much more confidence in their work. They would be considered first-class operators in any part of South or Central America.

Would it not be at least a satisfaction to have a universal alphabet throughout the world, so that operators in the United States might, when the desire overpowered them, pull up stakes and make for any part of South or Central America, or, in fact, any other part of the world, knowing that their services would be availed of? Would it not assist in uniting the fraternity? Do we not feel strangers to the thousands of our cloth who fly the international flag? Let us have a common base to work upon, so that the operator of any part of Europe, Asia or Africa may feel that his colleagues of North and South America are of the very same guild, and not, as now, comparative strangers, through the difference in telegraphic language. A good mechanic in Europe can be one in any other part of the world, but an American operator can only be one in his own country, and even will then be at some disadvantage in certain services. I might indulge in comparisons indefinitely, but your space demands consideration. SA.

JAN. 22, 1883.

THE ELECTRIC LIGHT.

LIGHTING A WHARF.—The Controller of Pittsburgh has been directed to advertise for the lighting of the Monongahela wharf with electric lights, not to exceed 20 in number.

CAPITALIZATION OF THE BRUSH COMPANY.—A well-informed correspondent writes to say that the capital stock of the original Brush company is $3,000,000, not $1,000,000 as stated in THE OPERATOR AND ELECTRICAL WORLD.

AN ELECTRIC LIGHT CONVENTION.—A convention of Brush Electric Lighting companies will be held at Cincinnati, O., on Tuesday, April 10, for the purpose of selecting an incandescent lamp to use with their storage batteries.

LIGHTS FOR HELL GATE.—In accordance with authority granted by the last Congress, the Lighthouse Board has leased the property at Hallett's Point, Hell Gate, which was selected as a site for the new electric light tower which will soon be erected.

THE ELECTRIC LIGHT AT CLEVELAND.—A Cleveland correspondent says that the rumored abandonment of the electric light in that city, recently mentioned in this column, must be an error. The light, he says, has not only not been abandoned, but the city contemplates additions to it. The old contract has been renewed, and there are now before the Council petitions for lighting the west side.

THE BROOKLYN BRIDGE CONTRACT.—The committee on the lighting of this bridge reported at the meeting of the Board of Trustees, March 12, that the contract had been awarded to the United States Electric Lighting Company, whose price for the "plant" complete was $15,500. The contract provided that the lights were to be in working order by April 15. There were to be seventy lights of 2,000 candle power each.

LIGHTING READING, PENNA.—City Councils have decided to introduce the electric light, and they have directed forty lamps, of 2000 candle-power each, to be placed on the leading streets, at a cost of $5,400 per annum, and to be ready in sixty days. The electric lights will be furnished and run by a local company. It is reported that a large company will be organized in Reading to manufacture electric supplies, the concern to employ about 400 people.

BROADWAY IN DARKNESS.—Those who were on Broadway in the vicinity of Fourteenth street last Sunday night, the 11th inst., were somewhat surprised about 9 o'clock to see all the lights of the United States Electric Company disappear, and leave Broadway, from Fourteenth street to Waverly place, in almost total darkness. Various rumors spread. Some people alleged that there had been a terrific explosion in the company's works; others that the company was out of material. Just as a policeman on the corner of Fourth street and Broadway was explaining to a crowd of people that that was a very common occurrence, and that the lights would not appear until after midnight, the bright flames burst out all along Broadway, and it was then but 9 o'clock. Nothing serious had been the matter.

TELEPHONE DEPARTMENT.

PROGRESS IN ALABAMA.—The Birmingham, Ala., exchange, opened May 8, 1882, has now 110 subscribers.

ANXIOUS TO INCREASE ITS CAPITAL.—Mr. William H. Bent, of the Bay State Telephone Company, has applied for permission for the corporation to increase its capital from $800,000 to $2,000,000, the additional amount to be used according to the needs of the company.

ATLANTA, GA.—A correspondent says that the Atlanta exchange, after years of mismanagement by local men, is now beginning to come to the front, having more than doubled its subscription in nine months. Subscribers are now increasing at the rate of 20 per month.

THE ADVANTAGES OF A GRUFF VOICE.—Referring to the fact that gruff voices are said to be heard much more readily at the telephone than squeaky ones, the *Commercial Advertiser* says that this is also the case in domestic life. For instance, the mother of a small boy might yell until her throat snapped, yet the youth couldn't hear her; but as soon as the "old man" sounded his slogan, that same boy would come scooting into the house like a streak of unfettered electricity.

A MISGUIDED INVENTOR.—An inventor has discovered how to make the telephone noiseless. It never seemed to us that that was the trouble. It is when the telephone is too awfully noiseless—at such times, for instance, when the "central" has sat down before the fire to dream sweet dreams of its bright infancy and refuses to be interrupted, or when it is has gone out to lunch, or for some other reason refuses to answer back a sound—that the telephone is at its worst, and then the man at it is beyond the inventor's genius to be made noiseless.—*Pittsburgh Leader.*

A MONOPOLIZING TELEPHONE COMPANY.—The Massachusetts combination controlling the telephone exchange system, which has established itself throughout New England and Northern New York, and which has just extended its operations into portions of the Northwestern States, as reported in our two last issues, now controls about 12,000 stations, a number many times larger than is controlled by any other telephone system in the country. The trunk lines embrace about 1,000 miles of wire, and more than twice this number of miles is represented in the local service in the various cities and towns. In the spring, about 1,000 miles of additional trunk lines will be built, and about 50 or 60 New England villages added to the general system. The combination in the Eastern section of the country includes now nearly all of Massachusetts, the whole of the State of Maine, Saratoga, Washington, and Warren Counties in New York, and nearly all of the States of Vermont and New Hampshire.

DASHES HERE AND THERE.

WASHINGTON, D. C.—The Mutual District Messenger Company is getting ready to open for business here.

FRENCH CABLE BROKEN.—The French cable has been broken. The steamer Minia left Halifax, N. S., on the 12th inst. to repair the break.

A CONTRAST.—The London *Electrical Review* says that the cost of taking out an American patent for seventeen years is about $35, while in England the same patent would cost about $1,000 for 14 years.

AN ELECTRIC CAR.—A dispatch, dated London, March 10, says: A large party gathered to witness the trial here to-day of the Trip electrical tram car. The car ran a distance of four miles satisfactorily, and fulfilled the requirements of the Board of Trade.

THE REIFF SUIT AGAIN.—On Monday a motion to compel Josiah C. Reiff to file additional security for costs in his suit to prevent the absorption of the Mutual Union by the Western Union was heard by Judge Freedman, in Superior Court, Chambers, but no decision was rendered.

WIRES REMOVED FROM BUCKET SHOPS.—In Chicago, on the 13th inst., the Mutual Union Telegraph Company, acting under a decision in the Federal Court, removed its wires from the bucket shops. The Western Union Company was not directly involved in the decision, and its wires will remain.

PENNSYLVANIA RAILROAD.—A new heavy-gauge wire has recently been strung on the Pittsburgh division, and is used exclusively for train service, giving an extra wire for general business. There is consequently no longer any occasion to contend for circuit, and the lot of the Pittsburgh division operators is happier than it was.

A WESTERN BULL.—Minnesota puts in an apparently good claim for "the cake" for the worst telegraphic bull. The artist wrote: "Send 2 sleigh to N. Gueseronedoff at end no rollers," while the farmer wanted to say: "Send 2 sleigh tongues, ironed off at end, no rollers." The check, 10 words, came out all right, but that was the only thing right about it. No affidavits accompany this report.

ELECTRIC MOTORS.—It is said that experiments are to be made with electric motors on the elevated railroads in this city, the Manhattan Company having decided to make a complete test. The motor to be used has been designed by Mr. Stephen B. Field, and the experiments will be under his charge. They will be made on the Thirty-fourth street branch, which is about one-third of a mile long, running from Third avenue to the Hunter's Point ferry.

TELEGRAPHERS AS EDITORS.—We have received Vol. 1, No. 1, of the Como, Col., *Headlight*. The editor is Mr. Richard Linthicum, a well-known Western telegrapher. This first number contains a column and a half communication from Mr. Edgar F. Sellon, train dispatcher Union Pacific Railway, Wallace, Kan. Mr. Sellon gives a humorous description of an effort he once made in a moment of weakness in the direction of editing a religious weekly.

ENGLAND'S MARTIAL TELEGRAPHS.—Lieut. Col. Du Plat Taylor, commanding the 24th (Post Office) Rifle Volunteers, has received instructions from the Secretary of State for War to form an army telegraph corps which might take the field in time of war. The nucleus of this "sister service" to the Army Postal Corps is a company raised principally from the Postal Telegraph Branch, which will be recruited to a strength of 200 rank and file, and supplied with the necessary field equipment.—*Electrical Review.*

THE SIGNAL SERVICE TO BE INVESTIGATED.—A dispatch from Washington on the 12th inst, says that although there have been two public denials of the statement that the Secretary of War had recommended and that the President had decided to order a court of inquiry to investigate the conduct of General Hazen and some of his subordinates in the Signal Bureau, there is excellent reason to reassert the correctness of it. It is understood that the delay in making the official announcement has been caused by some difficulty in arranging the detail of officers who will form the court.

A PITTSBURGH UNDERGROUND COMPANY.—The Pittsburgh Sectional Electric Underground Company, a Philadelphia corporation, has applied for the right to lay conduits and pneumatic tubes throughout the streets of Pittsburgh, Pa. The object of the company is to lay a cable for conducting all kinds of electric wires to all parts of the city. It is claimed that should the company receive the right of way, it would soon, after the lines had been laid, open an office somewhat similar to the Central telephone office for the conveyance of packages to all parts of the city. It is claimed it will also remove the evil of so many telegraph wires throughout the city.

TELEGRAPHIC LITIGATION IN THE WEST.—On Tuesday last, the 13th inst., Judge Snyder, of the Belleville (Ill.) Circuit Court, rendered another decision in the series of telegraph suits which have been before the courts for several months past, which prevents the Board of Trade Telegraph Company from building a line on or in any manner occupying the right of way of the Belt Road Company, in East St. Louis until the Supreme Court of the State passes upon the cases now before it, which will be about May 1. This will prevent the Board of Trade Telegraph Company from reaching St. Louis with its line until the time above mentioned, unless it selects some other route than the Belt Railroad.

HEAT BY ELECTRICITY.—A foreign paper, in an article on the generation of heat by electricity, notes an important advance in this direction by a Dr. Brand of La Rochelle, France, by means of an electro-generative candle, which yields a current of electricity while in the act of burning. The results obtained are not now of a practical nature, but demonstrate the possibility of electro-generative fuel. This torch or candle is prepared by making a paste of coal dust and molasses, and molding it into a stick, which serves as the inflammable wick of a candle. This rod is then covered with asbestos in a thin sheet, and dipped into fused nitrate of potash until a good thick coating of the nitrate adheres. The wick being ignited it burns away, and a current of electricity is drawn from the candle by wires inserted into the nitrate and the coaly wick.

STOCK QUOTATIONS.—Telegraph, telephone and electric light stocks were quoted on Wednesday of last week and Wednesday of this week as follows:

	March 7.	March 14.
Western Union Telegraph	83⅜	84⅛
Mutual Union Telegraph	....	17½
American Cable	65	66
American District Telegraph	38	30
Bankers and Merchants' Telegraph	120	120
Edison Electric Light	450	400
U. S. Electric Light	131½	132
Fuller Electrical Co.	33	32
Shaw Telephone	....	15
Mexican Telephone	4¼	4¼
American Bell Telephone	275½	289
Bay State Telephone	....	121
Northern Telephone	....	141⅛

ONE AND THREE-FOURTHS PER CENT. DIVIDEND.—The directors of the Western Union Telegraph Company, at the regular quarterly meeting on Wednesday last, declared a quarterly dividend of 1¾ per cent., payable April 15, the books to close March 20 and reopen April 17. A financial statement presented showed the net earnings for the quarter ended Jan. 1, to have been $2,053,000. The estimate for the present quarter, said to be the lightest in the year, was put at $1,750,000. A surplus of $3,617,635 was reported after paying the dividend in April, amounting to $1,400,000. The report goes on to say that the business of the calendar year ended Dec. 31, 1882, being fully balanced up, shows gross revenues for the year of $18,398,968.26, and net profits, $7,624,833.21. The rentals of all leased lines and cables are charged in current expenses, leaving only the interest and sinking fund on bonded debt, amounting to less than $470,000, as fixed charges on net profits. Deducting this, leaves the net profits for the year 1882 over $7,150,000 above fixed liabilities, being about 9 per cent. on the capital stock outstanding.

ENGLISH TELEGRAPHISTS GRUMBLING.—The *Electrician*, of London says: A large and enthusiastic meeting of telegraph clerks was held at Manchester on Saturday night last. The following resolution was adopted: "That this meeting desires to record its dissatisfaction with the scheme of revision lately applied to the telegraph services

inasmuch as it fails in many instances to satisfy the just claims of the clerks as set forth in the united petition in 1881, and cannot accept it as a final settlement." The "miserable recognition" by the government of the services of telegraph clerks was freely commented upon, and the Central Committee were urged to take immediate steps to obtain a parliamentary inquiry into their grievances. It was pointed out that, while telegraph clerks in London were paid for their Sunday services, it was "repeatedly and unjustifiably" denied to their provincial brethren. The meeting expressed its gratification at Mr. Fawcett's recovery from illness, and tendered its cordial thanks to him for his earnest endeavors to ameliorate their condition; and also to members of Parliament, the press and the public for the support which had been accorded to the agitation.

NO PAIN WHEN KILLED BY ELECTRICITY.—It has often been wondered if persons killed by electricity or a flash of lightning felt pain. The London *Daily News*, in discussing a kindred subject, says that "scientific men seem all agreed that the electric discharge which causes death is incapable of inflicting any sensation. The reason of it occasioning no pain has been explained—with what correctness we do not pretend to pronounce—by the alleged paralyzation of the nerves before they have time to convey any sensation to the brain. Physiologists profess to have demonstrated that a nervous vibration cannot be communicated to the brain in less than a tenth of a second, and that another tenth of a second must elapse before a sensation can result from the vibration thus communicated. One-fifth of a second must therefore necessarily intervene between the actual infliction of an injury and the experience of pain from it. But the flash from such an apparatus as has been described would paralyze every fragment of a nerve in man or beast in something like a hundred thousandth part of second. Such a death, we are told, must necessarily be painless, because the whole mechanism by which alone pain could be produced would be virtually destroyed long before it could operate."

"BOOTS VERSUS BRAINS."—Under this caption a lady subscriber writes: "Seeing those unhappy Chicago ladies in print reminds me of many incidents. I am tempted to give one and perhaps another. Passing the table one day where Miss —— presided over a 'quad,' I observed a strange fire in her eye and stopped to inquire the cause. With a glance of supreme contempt upon the great sprawling boots beside her, she explained: '*He* has had his salary raised. If I were no better operator than he I would jump from the window (fifth-story window).' And she did—that is, she went West, on and on, to where the free, wild winds blow the cobwebs from men's brains, where there is no premium on 'boots' and where she is paid for her work like a man. This young lady has a brilliant intellect (shocking thing in woman!), and, by reading in the street-cars and with a book in her hand at lunch time, managed to keep remarkably well informed—for an operator. Soon after she had 'jumped from the window' a chief of a Western division said to me: 'Why here is Miss —— in Omaha, taking press reports: she receives one day and "the man" the next, and she does the best, especially on long foreign names; takes it down like a real old-timer.' However, the cobwebs were too thick in Omaha; it was not until she had sped on still further West that she found herself beyond the petty reign of 'boots.'"

NEW YORK CITY ITEMS.

Echoes from 195.

On the 14th inst. a base-ball club was organized in 195.

Mr. H. W. Orr has obtained a position on the night force.

Congress having adjourned, Mr. W. L. Ives, the Senate operator, has resumed work in 195.

Mr. M. M. Davis, Southern Traffic Chief, is confined to his residence, on account of throat trouble.

Mr. Thomas Allen has returned to work, after an illness of over three months. He takes his old wire, the Elmira quad.

In the chess tournament in 195, Mr. D. B. Mitchell leads with 11 games won, 2 lost. Mr. Weeks is second with 10 games won, 2 lost.

Messrs. M. Brick, P. J. Tierney, Wm. D. Fuller and Edwin J. Getty, are the first-class operators who work the the Philadelphia quad.

Mr. Gisborne Ward, an old-timer here, is a godson of Mr. F. Newton Gisborne, who, it is claimed, was the projector of the Atlantic cable.

The Wheatstone having somewhat eased the pressure of business on the Chicago Morse circuits, Mr. Frank Howell has been transferred to the regular Boston quad, and Mr. J. E. Post to the St. Louis quad.

In addition to his other duties, Mr. L. E. Weller, whose name has so frequently appeared in this column, has for a long time been assigned to the responsible task of compiling from the morning signal service reports an epitome of the weather throughout the country, for the information of the principal offices of the company. This work Mr. Weller performs with entire satisfaction. It is well known that Mr. Weller has made the barometer a study for many years. When, therefore, last Saturday, the day predicted by Wiggins for his great storm, the office barometer fell within a few hours from 30.70 to 29.30, inquiry was naturally made of Mr. Weller as to the portent thereof. Mr. Weller stated that it was not an abormally low pressure the normal atmospheric pressure in this lattitude being 30.30, and he had known the barometer to register 28.95. When the barometer again began to rise, Mr. Weller said it was an indication that the storm was moving off. There is no doubt that Mr. Weller's composure allayed the fears in many timid minds.

Signal service reports are received in 195 thrice daily; namely, at 7.37 A. M. and 3.37 and 11.37 P. M. Three signal circuits are made up—one between Eastport, Me., and New York; one between Milwaukee and New York, which has several branch circuits, connected by repeaters, and another between New York and the headquarters of the Signal Service Bureau in Washington, over which the reports from the two former circuits are sent as fast as received. There are eleven stations on the Western circuit, and five on the Eastern circuit. Chicago, Milwaukee and Boston are collecting and relaying stations. The signals are started on schedule time, each station sending its reports in rotation, beginning at the nearest office to New York on the Western circuit and the farthest on the Eastern circuit. The reports are sent in cipher and there is a distinct code for morning, afternoon and midnight reports, so that if a morning report is by any means delayed until afternoon or night there can be no mistake. Mr. Gus Coleman has transmitted the morning and afternoon signals on the Washington circuit for years. Mr. Coleman is the acknowledged wit of 195.

There are three dining rooms in the Western Union building, the main one and largest of which is on the eighth floor. It is probably the highest restaurant in the city, being about 130 feet above the street. It is large, well lighted, cheerful and neatly kept. This room is divided into three apartments, the central one of which is used as a larder, and those on either side for dining rooms. When the restaurant was first opened meats were sold at 14 cents per plate, and tea, etc., at 3½ cents per cup; and as the lunch time of the operators was reduced from half an hour to twenty minutes, it was understood that the low prices were intended to compensate for the diminished lunch time. At present the prices charged are about the same as in any of the down-town eating houses. A small plate of mutton, beef, etc., is sold for 10 cents; a large plate, 20 cents; tea, coffee, etc., 5 cents per cup. Tables are reserved for those who bring their lunch, and they are at liberty to purchase tea or coffee. There is another dining room on the fifth floor, set apart for the heads of department; and one on the third floor for the executive officers of the company. The main dining room is open from 11.30 A. M., until 2.30 P. M., for the day force, and from 7.15 P. M., until 9.30 P. M. for the night force. The convenience of the restaurant to the operating room is much in its favor, as is also the fact that meals are paid for by tickets, the amount of which are deducted from the salaries. No intoxicating liquors or tobacco are sold on the premises. In all an average of 300 meals are served daily in the building. It is reported that the dining rooms will shortly be dispensed with, the auditing department moved into the quarters now occuby them and the rooms thus made vacant leased to outside parties.

Other City Items.

Mr. H. K. Miller, manager W. U. and G. N. W. Telegraph offices, Carthage, N. Y., was in the city this week.

Mr. George Black, manager of the Hamilton, Ont., G. N. W. office, accompanied by Dr. A. M. Rosebrugh, of Toronto, visited New York during the present week.

The Manhattan District Telegraph Company has leased the entire corner Broadway and 31st street. This, when enlarged, will, it is said, be the finest district office in the city. The same company has also secured the location for a district office in the triangle at 23d street and Broadway, now occupied by the Erie Railroad.

The Telegraphers' Aid Society has had a repetition of the experience of the N. Y. Electrical Society, there not having been a quorum present in response to the call for the annual meeting. In consequence, the meeting was postponed until Wednesday, 21st inst. at 6 P. M., when it will be held in the rooms of the N. Y. Electrical Society, 114 Greenwich street.

It would seem to be due to the managing boards of such associations as the New York Electrical Society and the Telegraphers' Aid Society, that the other members of the societies should attend the annual meetings in sufficient numbers to secure a quorum, and at the same time to show their officers that the voluntary and sometimes arduous work done by them is appreciated.

The Fire Commissioners have passed resolutions requiring the American and Mutual District Companies to establish direct telegraphic communication between the several district offices and Fire Headquarters, or else to modify the printed directions accompanying their instruments so that the user of the instrument may understand that the alarm is not sent to the Fire Department, but only to the district office.

At the meeting of the N. Y, Electrical Society, March 9, Mr. C. S. H. Small was elected president for the ensuing year. The attendance not being large, the election of the rest of the officers was postponed until next meeting, which takes place March 16. Mr. F. W. Cushing will also describe the latest developments in harmonic telegraphy, and at the same meeting a valuable paper on Cable Testing by George W. Hamilton will be read.

On Wednesday evening last a driving belt 42 inches wide in the United States Illuminating Company's generating depot, No. 36 Stanton street, slipped and broke, putting the machinery out of gear. One of the workmen was struck by the belt and slightly injured. Some of the places that received electric light from the depot were in darkness for several hours, until the wires from other depots could be switched on to cover the district supplied from Stanton street.

On Tuesday, March 13, the Board of Aldermen granted permission to the New York Electric Lines Company to open the streets for the purpose of running wires underground. The company is to pay the city 2 per cent. of its gross receipts. There was considerable opposition to the granting of the franchise, and some intimated that the scheme was put through under such pressure that it looked very much like a "job." The Electric Lines Company was incorporated in October, 1882, by Sidney F. Sherbourne, William Force Scott, George L. Weed, Herbert P. Brush and Edward Barr. Its capital stock is $5,000,000, in 50,000 shares, of which 48,700 shares are held by Sidney F. Shelbourne, the company's president.

PERSONAL.

OTTUMWA, IOWA.—Mr. J. F. Conley is taking press report at Ottumwa, Iowa. His beautiful penmanship makes him many friends among the printers wherever he goes.

DIRECTOR E. D. MORGAN'S SUCCESSOR.—On Wednesday last Mr. John T. Terry was elected a director of the Western Union Company, to fill the vacancy caused by the death of ex-Governor Morgan.

AMSTERDAM, N. Y.—Mr. Al. Bordwell has relinquished his position in the W. U. office here to accept a similar one in Eastern Massachusetts. He is succeeded by Mr. M. J. O'Bryan, formerly of the W. U. office in Syracuse.

If Robert C. Fulton, formerly of Pittsburgh, Pa., will address the undersigned, he will hear of something to his advantage.

B. W. FLACK,
Standard Oil Company, Pittsburg, Pa.

AN EX-TELEGRAPHIST'S COUNTRY HOUSE BURNED.—Clifton, the country residence of Mr. James Elverson, publisher of the *Saturday Night*, situated near Georgetown, D. C., has been destroyed by fire. Mr. Elverson will be remembered as an old operator.

WHY MR. GOULD GOES ABROAD.—It is now said that the true reason for Mr. Gould's contemplated two years' trip is that the busy man's health is greatly impaired, that his mental faculties are not as strong as formerly, and that rest and relaxation from the great strain that has been upon him are essential to the retention of his mental and physical vigor. The report says that Mr. Gould, having been forced to see this by his wife and physician, has acceded to their demands, and is arranging for the trip with the vigor he usually displays in whatever he undertakes.

MR. GOULD'S WORLDLY POSSESSIONS.—Much excitement was caused in "the Street" this week by the reported illness of Mr. Jay Gould, who is at present in Florida. The report was, however, subsequently denied. The incident led to a discussion of Mr. Gould's worldly goods, and this is about the way they figured it up: He owns one-third of the Western Union stock, which represents a par value of nearly $27,000,000. His interest in the Union Pacific, Missouri Pacific, Texas Pacific, Missouri, Kansas and Texas, Erie, Lackawanna, St. Paul, Northwest, Omaha, Iron Mountain, St. Louis, Kansas City and Northern, Kansas Pacific, St. Louis and San Francisco, the Elevated and other stocks is estimated, by careful observers, at $60,000,000, making a volume of nearly $87,000,000 worth of shares. Besides this snug pile, which would of itself enable him to keep the wolf from the door for a while, he owns bonds in Union Pacific, Wabash and other roads, and also possesses much real estate. It was estimated that his real estate alone—which includes his country seat at Irvington, his Fifth avenue palace, the *World* Building and his property on Broadway, near Wall street—is worth nearly $2,000,000, and altogether Mr. Gould's "barrel" contained about $100,000,000.

BORN.

COLWELL—March 3, to Chas. Colwell, W. U. Telegraph office, Columbus, Ohio, a son.

COOMER—March 12, to W. A. Coomer, manager W. U. Telegraph office, Eden, Ohio, a son.

SEBREE.—On March 6, 1883, to Mr. Willard F. Sebree operator, Wabash, St. Louis & Pacific Railway, Paris, Ill. a son.

ELECTRICAL PATENTS ISSUED.

Week ending March 6, 1883.

Apparatus for regulating the transmission of the electric force; Maurice Levy, Paris, France	273,291
Air blast attachment for commutators of dynamo-electric machine; Elihu Thomson, New Britain, Conn.	273,406
Binding screw for electric wires; Ellery C. Coolidge, Boston, Mass.	273,259
Coupling for electrical conductors; Percy Ruskin Allen, Southwark, England	273,429
Electric arc lamp; George D. Allen, Brooklyn, N. Y.	273,336
Electric railway signal; Charles J. Means, Boston, Mass.	273,377
Electrical visual indicator; Jas. U. Mackenzie, N. Y.	273,563
Electrical car brake; David J. Macpherson, Sioux Falls, Dak.	273,565
Electrode for secondary batteries; William S. Platt, Waterbury, Conn.	273,598
Electric clock; D. Fred Sweet, Hastings, Mich.	273,634
Electrical railroad; Thomas A. Edison, Menlo Park, N. J.	273,494
Electro-magnetic railway system; Thomas A. Edison.	273,490
Fire and district telegraph; Thos. D. Lockwood, Malden, Mass.	273,374
Incandescing electric lamp; John S. Kelso, Stamford, Conn.	273,366
Incandescing electric lamp; Thomas A. Edison	273,485-6
Incandescent electric lamp; Henry Lea, Birmingham, County of Warwick, England	273,554
Insulated electrical conductor; William R. Patterson, Chicago, Ill.	273,593
Induction coil; George H. E. Trouvelot, Cambridge, Mass	273,643
Magnetic ore separator; John Rae, New York, N. Y.	273,309
Method of filling telegraph cables with insulating substances; Wm. R. Patterson, Chicago, Ill.	273,592
Method of controlling the electrical transmission of power; Edward Weston, Newark, N. J.	273,329
Regulator for dynamo-electric machines, Thomas A. Edison	273,487-8
Regulator for driving engines of electrical generators; Thomas A. Edison	273,491
Railroad signal; William Hadden, Brooklyn, N. Y.	273,513-4
Railway signal apparatus; William Hadden, Brooklyn, N. Y.	273,515-6-7
Railway signal apparatus; Jos. P. Livermore, Boston, Mass.	273,558
Secondary battery; Thomas A. Edison	273,492
Telegraph sounder; William E. Davis, Jersey City, N. J.	273,264
Turntable for electric railways; Thomas A. Edison	273,489
Underground conduit for electric wires; Wm. Plankinton, Milwaukee, Wis.	273,305
Valve gear for electrical generator engines; Thomas A. Edison	273,493
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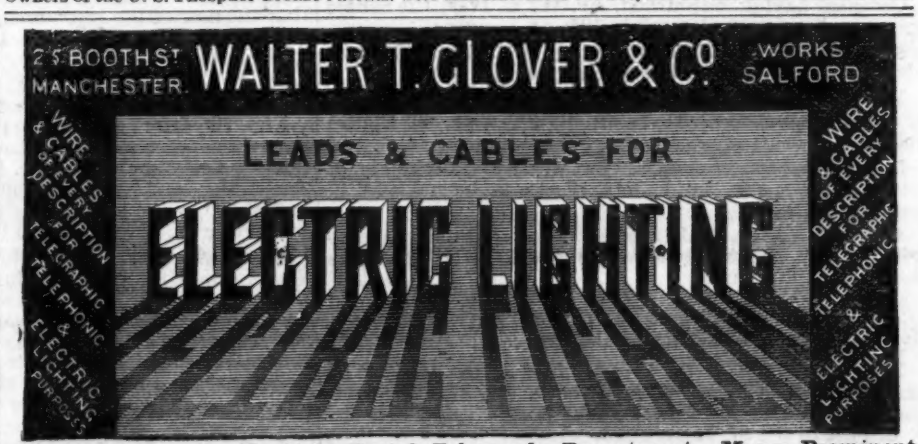
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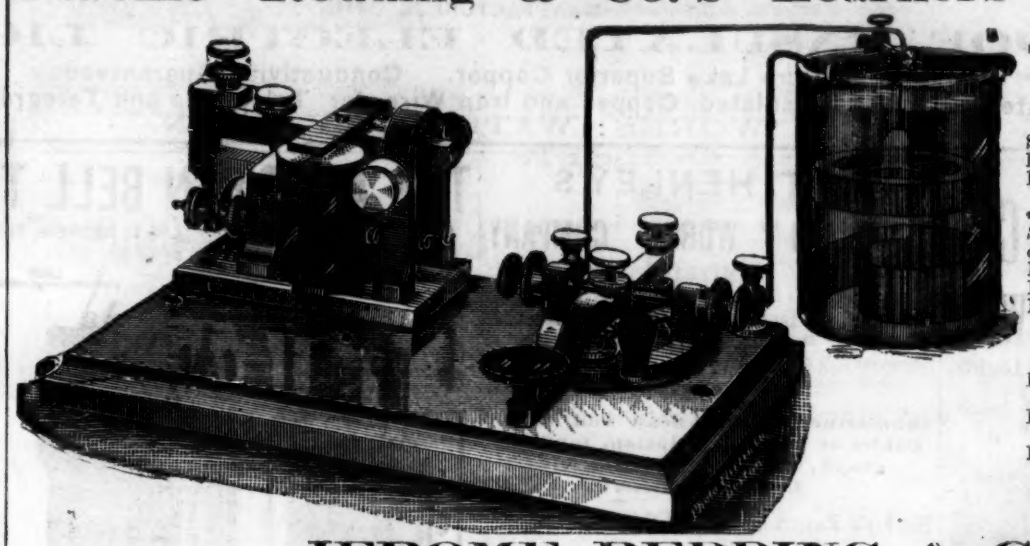

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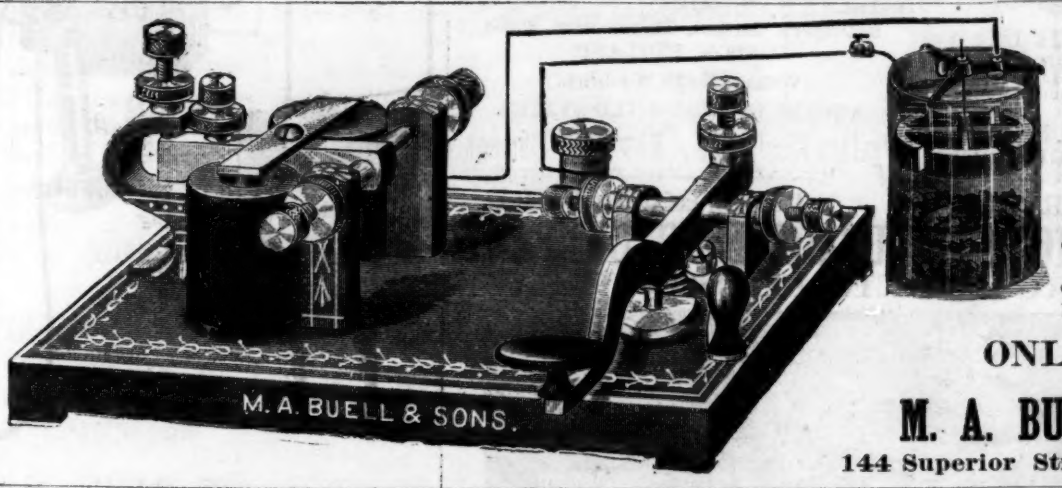

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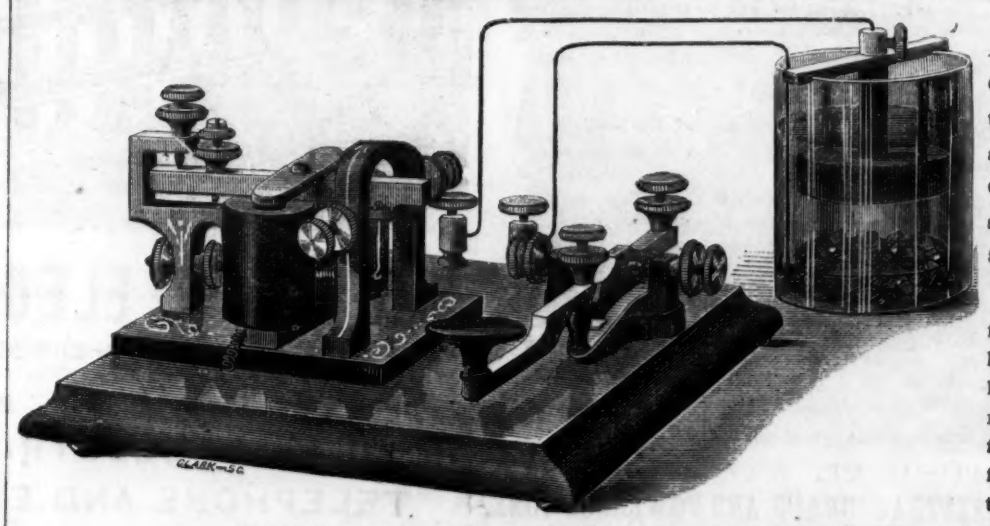

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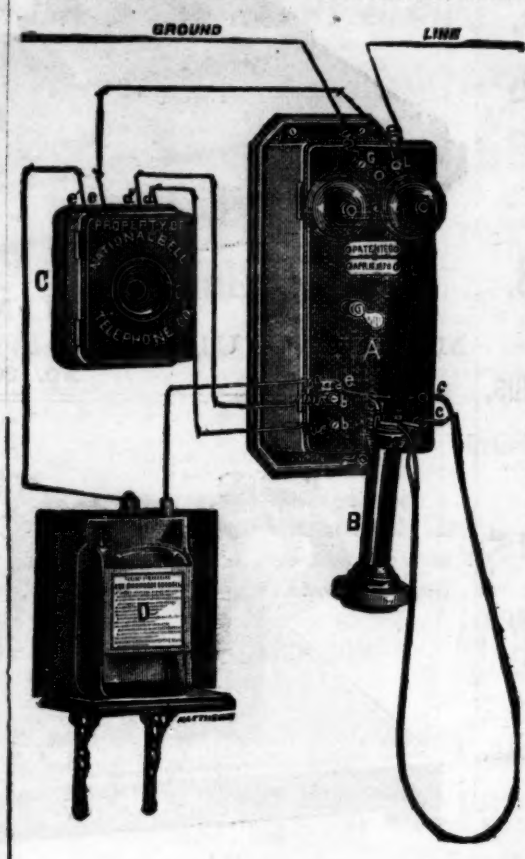

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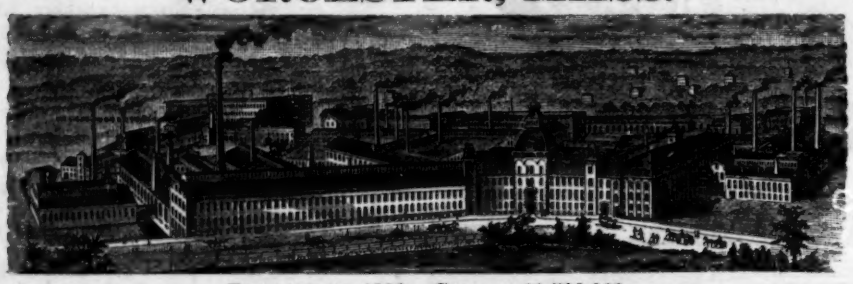

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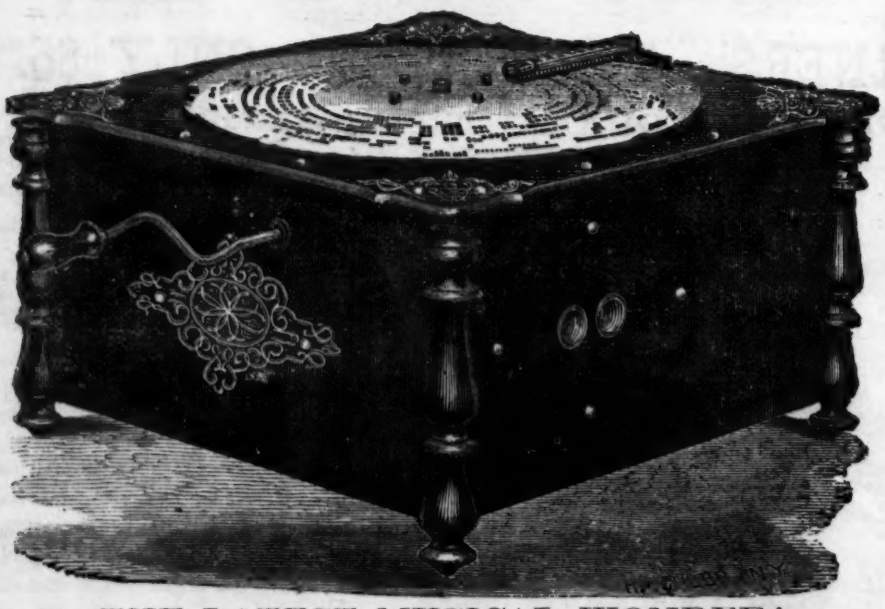

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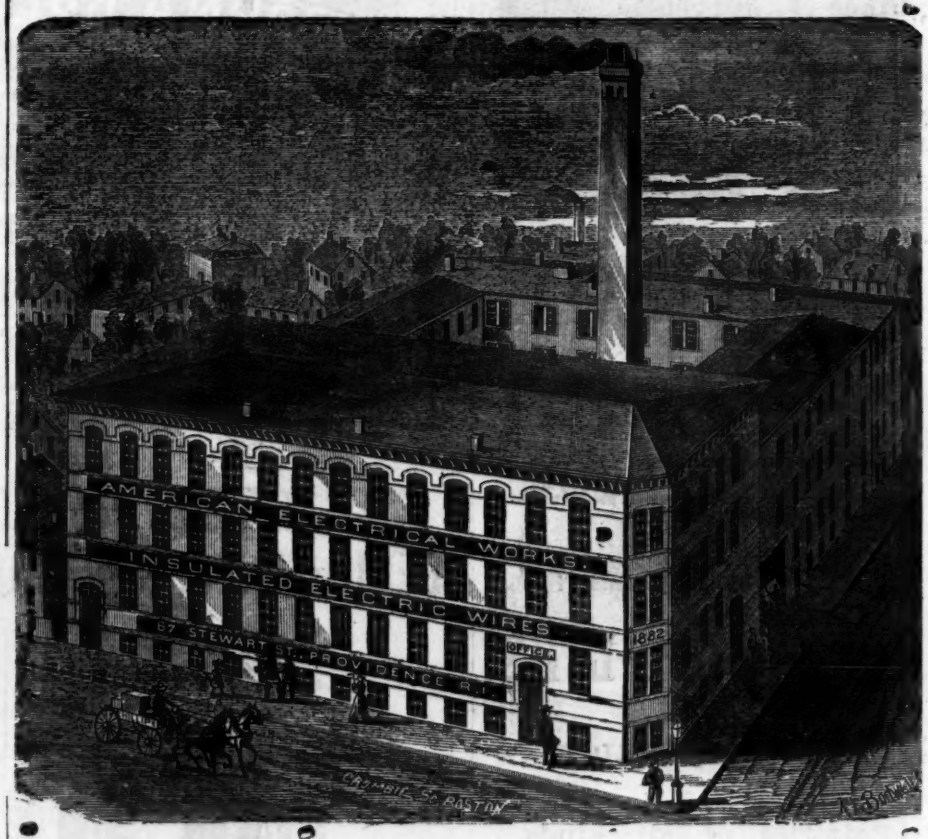

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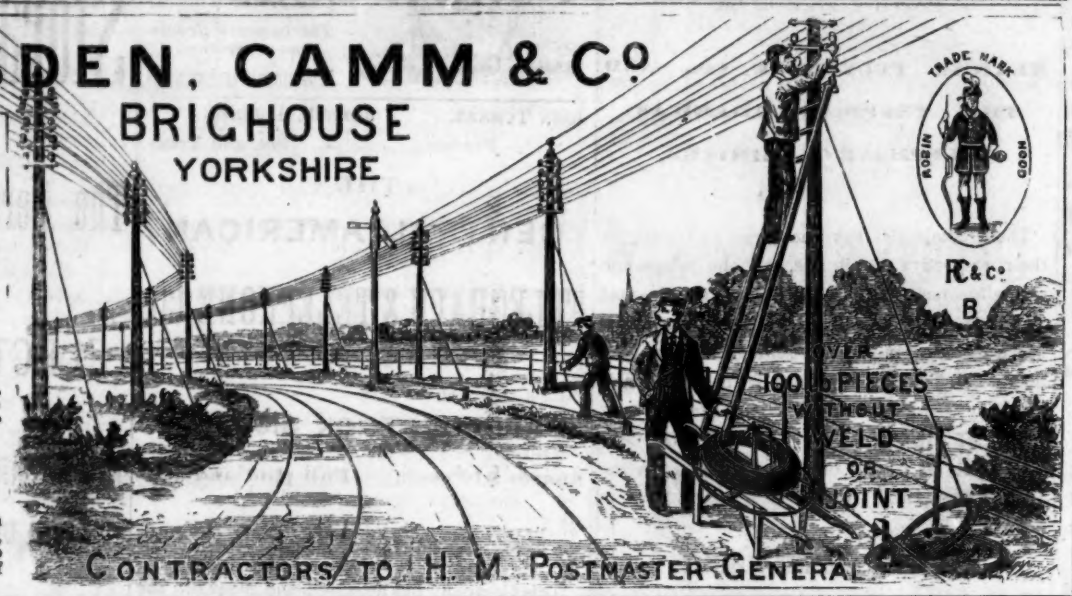

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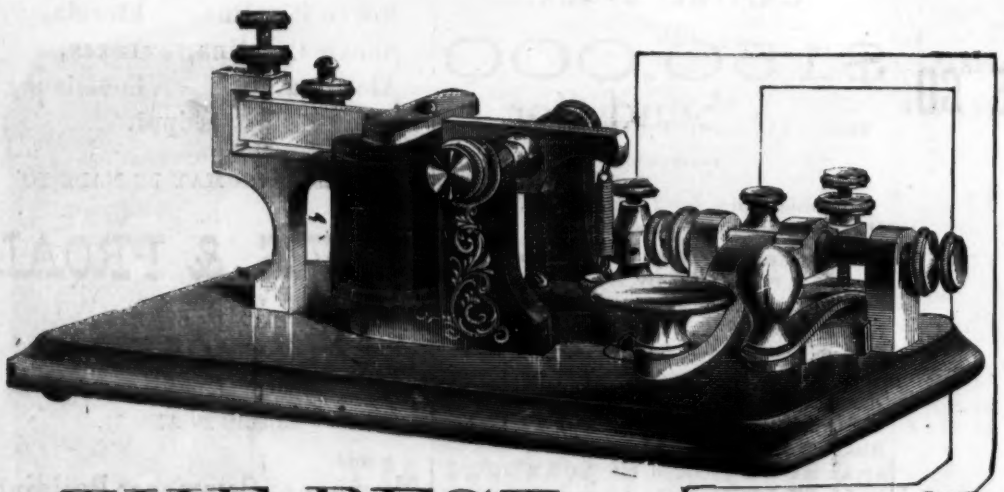

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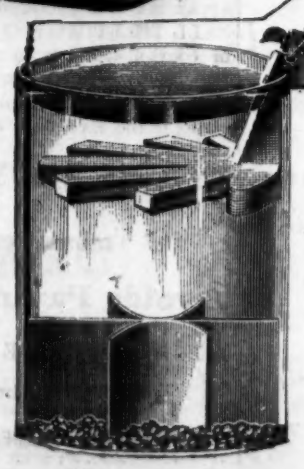

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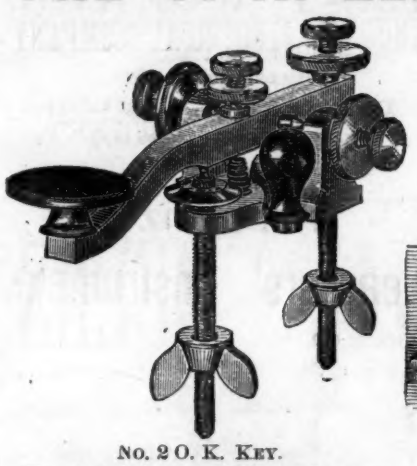

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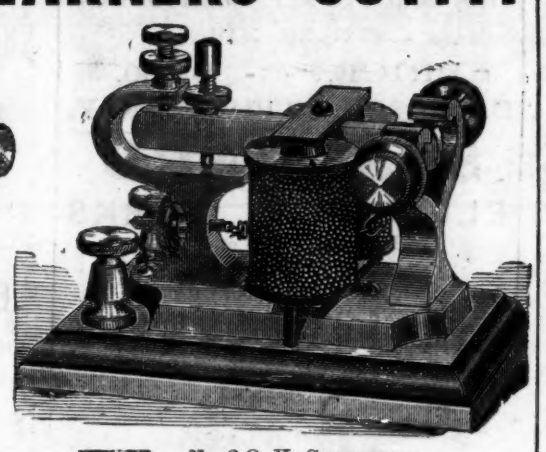

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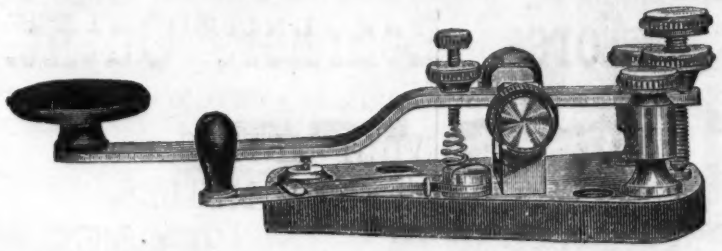

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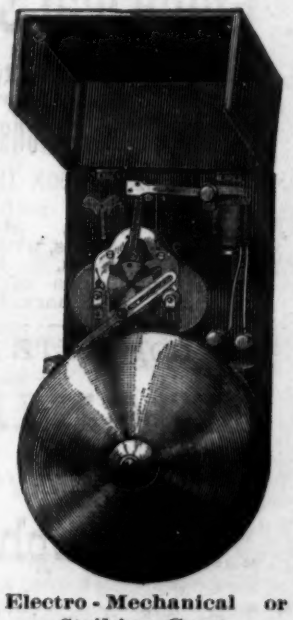

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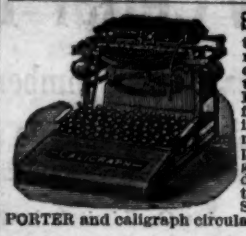

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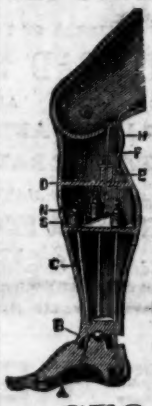

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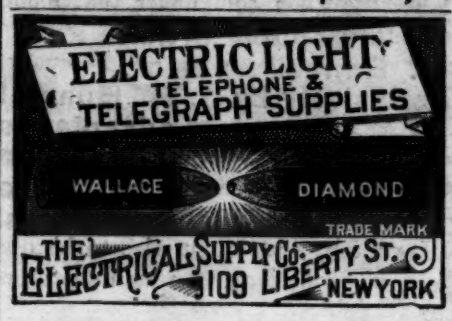

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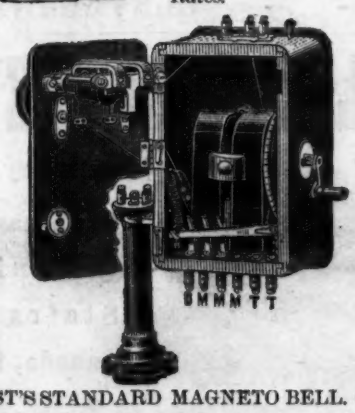

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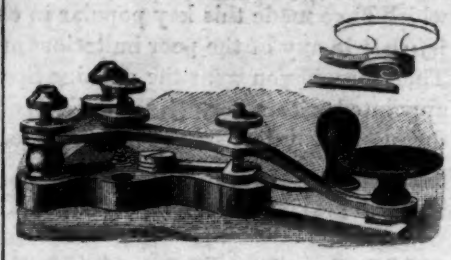

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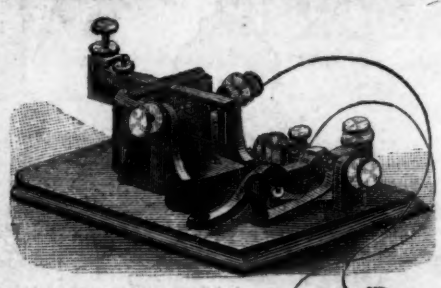

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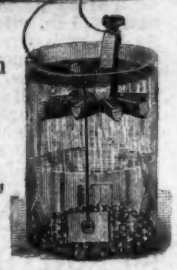

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